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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue.

Nine Months' Passenger Traffics

STANDARD-FARE receipts on all standard-gauge British railways (except London Transport and the Whitechapel & Bow) for the first nine months of 1936 showed an increase of £106,577, or 2·01 per cent., in comparison with the corresponding period of 1935, and amounted to £5,406,022 out of the total receipts of £39,202,730 from passengers. Standard-fare passengers, however, numbered only 66,175,558 out of a total of 663,816,140. Monthly return and period excursions brought in £15,217,566 during the nine months, an increase of £652,924, or 4·48 per cent., with an increase of 4·73 per cent. in numbers. Ordinary first class journeys for the nine months were 10,566,781, an increase of 736,794, and represented 1·59 per cent. of the total ordinary passenger journeys. In the first class ordinary receipts of £2,840,798 for the same period there was an increase of £221,944, and these receipts were 7·25 per cent. of the total from ordinary passengers. During the three months July—September, inclusive, the number of standard-fare first class passengers originating on the four main-line railways was 514,316, producing gross receipts of £311,592. In the same period the four companies took £475,248 from first class monthly return and period excursions. Total season ticket receipts for the nine months were £6,466,218, an increase of £80,532, or 1·26 per cent., but in the earnings of £9,514,661 from parcels and miscellaneous traffic there was a decrease of £14,773, or 0·16 per cent., notwithstanding an improvement of £35,849 during the third quarter. Total receipts from passenger train traffic (excluding mails and parcels post) were £55,183,609, an increase of £1,540,564, or 2·87 per cent.

* * * *

1937 Rolling Stock and Works Programmes

From the details of the new rolling-stock and works programmes of the four group railways set out on page 70, it will be seen that provisions have been made for the construction during 1937 of a total of 532 locomotives, and approximately 1,700 coaching vehicles and 34,000 goods vehicles. These totals do not necessarily, for each railway, take into account locomotives and rolling stock already provided for by loans made to the companies under the Railways (Agreement) Act of 1935, and already under construction. Although manufacturers will regret that some of the programmes do not include the building of locomotives and rolling stock in contract shops, nevertheless, a great deal of benefit will inevitably accrue from orders which must be placed outside for component parts, details, and materials required for use in the companies' own shops. Apart also from locomotives and rolling stock, the influence of these large programmes on the amount of work available to suppliers of rails, bridgework, building materials, paints, and a thousand and one other necessary items manufactured in this country must be both wide and welcome and serves again to emphasise the importance of the railways of this country as buyers in the industrial field.

* * * *

The Week's Traffics

The latest traffic returns of the group companies cover the week ended January 3 in the case of the L.M.S., Great Western, and Southern Railways and therefore include four days of the old year. The L.N.E.R. return for the week ended January 2 includes five days of the old year. Increases in passenger train receipts are shown by each of the four companies and total £70,000, and merchandise earnings are better in each case, giving a combined improvement of £37,000. Coal traffics, however, show a net advance of only £1,000. In the corresponding week a year ago passenger train receipts were up £31,000 and coal class earnings showed an improvement of £72,000, but merchandise had a gain of only £9,000.

	1st Week				
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.
	£	£	£	£	%
L.M.S.R. ..	+ 19,000	+ 19,000	− 21,000	+ 17,000	+ 1·6
L.N.E.R. ..	+ 18,000	+ 5,000	+ 26,000	+ 49,000	+ 6·29
G.W.R. ..	+ 11,000	+ 9,000	− 5,000	+ 15,000	+ 3·38
S.R.	+ 22,000	+ 4,000	+ 1,000	+ 27,000	+ 8·11

The latest returns of the Irish railways are for the week ended January 1 and therefore include six days of the old year. They appear as for the 52nd week of 1936 and show aggregate increases of £21,765 on the Great Northern and £199,770 on the Great Southern.

* * * *

The War in Spain

Political disputes *per se* are outside the scope of THE RAILWAY GAZETTE, but the effects of such disputes upon the development of transportation in general and railways in particular are essentially matters for record in our columns. We have therefore published in connection with the present civil war in Spain messages we have received from well-informed correspondents on both sides of the front, and so far have been enabled to give our readers

fairly comprehensive details of the effects of the conflict on the railways of Spain. One of our correspondents has now called our attention to a paragraph that appeared as long ago as 1923, in "The Railways of Spain" by George L. Boag, and comments: "Unfortunately there is an impression in Great Britain that the civil war started with General Franco's movement of July, but in reality it began long before that; Mr. Boag has shown it was beginning in 1923, although at that time presumably he could not speak openly." As a matter of general interest we reproduce the paragraph in question on page 49. The same correspondent adds that: "In 1925 there were communist outbreaks in Andalusia, and in 1931 the reds were already burning churches. After the farcical election of February of last year the 'workers' committees,' which have been in control of the so-called constitutional government (and of everything else) began slaughtering prisoners and committing similar barbarities long before July 20, when General Franco, in desperation, forestalled the 'dictatorship of the proletariat' announced for a later date."

* * * *

Parcels Traffic

According to the Ministry of Transport returns of the British railways for 1935, passenger train parcels traffic (*i.e.*, packages under 2 cwt.) provided gross receipts amounting to £6,550,688. This important traffic, the net revenue from which is not revealed was the subject of a paper recently read before the Birmingham and District Branch of the Industrial Transport Association. The author, Mr. Rayner-Smith, of the Great Western Railway, dealt principally with the scope of the services provided, and the efforts that are being made to extend facilities to outlying districts. For instance, the Great Western Railway country lorry services, which, of course, serve also as feeders to freight trains, now operate from 150 centres. Mr. Rayner-Smith also stressed the point that railway parcels rates are based only on the rail journey, delivery being free within specified areas. In Birmingham, for instance, there is no surcharge for collection or delivery of parcels destined for or originating within an area of 45 sq. miles. Indeed, so generous is the extent of this free service that the receipts from collection and delivery charges for the British railways amounted in 1935 to only £433,910.

* * * *

The Bergen-Oslo Main Line

In view of the high plateau lying between Bergen and Oslo, the former port remained isolated from the main Norwegian railway system until the present century. The commercial and strategic advantages of such a line as that now joining the two points were appreciated many years ago, but, when the matter was discussed in the 1870's, the engineering difficulties of the enterprise were considered too great to justify putting the work in hand. In 1875, however, it was decided to build a narrow-gauge (3 ft. 6 in.) railway for the 66 miles from Bergen to Voss, and this was completed in 1883. After much agitation an Act was passed by the Storting in 1894 authorising the conversion to standard gauge of the Voss line and its continuation via Raundal and Urhoved to Lake Taugevand. Four years later the further extension through the Hallingdal was decided upon. Between 1898 and 1904 the Bergen—Voss section was converted to standard gauge, and various portions of the new line were brought into service as completed. Meanwhile, the longest of the 184 tunnels involved—the 5,800-yd. tunnel at Gravahalsen—was bored in 1902. On October 7, 1907, the rails between east and west met at Ustaoset, and in 1908 traffic was opened between Bergen and Gulsvik. The Oslo (then Christiania) to Roa section had been in operation for some years as a part of the Christiania & Northern Railway, and on the completion of the Gulsvik—Roa link, the through line between Bergen and Oslo was placed in service on November 27, 1909.

* * * *

Bergen Station and its Traffic

The main-line traffic of the Bergen-Oslo Railway, referred to in the previous note, is handled at Bergen by a handsome and conveniently-arranged modern station, of which we reproduce two illustrations on page 60. This station has its main frontage on Ström Gaten, and is therefore some little distance from the harbour, where the Bergen—Newcastle mail vessels arrive. Just outside the main station, therefore, a railway branch to the harbour leaves the main line and runs under the town in tunnel to the quay side. Through carriages connecting with boats are hauled by tank engines from the quay to the junction and backed on to the Oslo train in the main station. The most important trains from Bergen station are of course those over the 306-mile line to Oslo East (Östbanestationen). This route, which is one of considerable scenic attraction, and is probably the finest railway route in Norway, runs for no fewer than 24 miles of its length in tunnel. Local traffic from Bergen includes a frequent service to Nesttun, but the former 2 ft. 6 in.-gauge 16-mile branch thence to Os (or Osøren) was replaced by road services on September 1, 1935. This branch was a private steam-operated line owned by the Nesttun-Osøren Railway Company, and the replacing road facilities are now given by the Bergen-Osøren Motor Company.

* * * *

The International Bridge at Haparanda

Apart from the fact that ordinary through running would have been impossible by reason of the difference between the Russian (5-ft.) gauge and the standard (4 ft. 8½ in.) gauge used in Scandinavia, the railway systems of Sweden and Russia did not meet at the time war broke out in 1914. There were obvious advantages, however, in the establishment of land transport round the head of the Gulf of Bothnia so that Finland (then within the Russian Empire) might be approached overland. During the first year of the war, Karungi was the terminal station of the Swedish railway system and became, as the central point of an extensive international traffic between Sweden and Finland, very well known. After the completion of the Swedish line to Haparanda in December, 1915, this temporary fame of Karungi was over, and at present there are no traces of its short-lived importance. Haparanda is now the Swedish frontier station for Finland, and, as may be seen in the illustration on page 60, the handsome station buildings include the station hotel, a typical Swedish feature. On the same page we also illustrate the international bridge over the Tornea river, linking Haparanda with Tornea in Finland, which was opened in 1919. As a correspondent pointed out in our issue of December 18 last, there are four rails on what may be termed a single track across this bridge in order to accommodate the two gauges, as the difference between 4 ft. 8½ in. and 5 ft. is insufficient to permit of merely one extra rail.

* * * *

Scrapping Pennsylvania Freight Cars

The programme of scrapping 5,000 wagons on the Northern Pacific to which we referred in our issue of August 9, 1935, is eclipsed by the breaking up of 32,000 such vehicles on the Pennsylvania. Whereas the work on the Northern Pacific was spread over twenty-two depots,

on the Pennsylvania it has been concentrated at three, the most intensive operations being carried out at Conway, near Pittsburgh. Here a maximum of fifty vehicles a day has been dealt with, in what is claimed to be the world's largest railway scrap yard. Describing the work at Conway, the *Railway Age* says that the condemned stock arrives in trains of a hundred vehicles, being then sorted into fifty-car lots, comprising twenty box, ten gondola, and twenty all-steel hopper cars. The steel cars, after reclamation of material suitable for further use, are reduced to marketable scrap steel by gangs working with air hammers and oxy-acetylene torches. Wooden bodies are sold intact, or for fuel, or otherwise are burned. The scrapping programme coincides with an extensive scheme of replacement of Pennsylvania freight stock, outlined in our issue of June 26, 1936, page 1202. Scrap prices are now high, and the railway will also benefit from the release of so much material for repairs.

* * * *

The Testing of Materials

At regular intervals a congress is held by the International Association for Testing Materials, and at the last congress, held at Zurich in 1931, an invitation extended by the British delegates, to hold the next congress in this country, was accepted. From April 19-24, 1937, therefore, this function is to take place in London, under the presidency of Sir William Bragg, O.M., K.B.E., President of the Royal Society. Its scientific and industrial importance, in view of length of time which has elapsed since last the study and testing of materials were reviewed on an international basis, needs no stress. Among the British technical organisations participating are the Institutions of Civil, Mechanical, Electrical, and Locomotive Engineers, and the name of Sir Nigel Gresley, President of the Institution of Mechanical Engineers and Chief Mechanical Engineer of the London & North Eastern Railway, figures on the Congress Executive Committee. The proceedings will be based on selected papers, more than 200 of which have been contributed by leading authorities in their particular fields, drawn from nations in all parts of the world. The groups of subjects covered include metals, their mechanical and chemical properties, wear and machinability; metallography; light metals and alloys; and a great variety of inorganic and organic materials, such as concrete and cement, artificial stone, bricks and other ceramics, textiles, cellulose, timber, colours, and varnishes.

* * * *

Swedish Turbine Locomotive Results

In the course of an interesting letter addressed to us recently by the designers and builders, it is stated that the Ljungström non-condensing turbine locomotive placed in service on the Grängesberg-Oxelösund Railways in the early part of 1932 has given highly satisfactory results, hauling heavy iron ore trains of 1,750 tons behind the tender, and negotiating long grades of 1 in 100 unassisted. The adhesion weight of this locomotive is 72 tons, and comparative tests between it and modern reciprocating type engines in use on the same railway carried out in July, 1933, show that a fuel saving of 23·8 per cent. was effected by the turbine locomotive; and this saving is, we are informed, still maintained, although the locomotive is now, of course, no longer a new one. The main advantage claimed for it is, however, that considerably heavier trains can be hauled by the turbine locomotive, thus improving the time schedules of the railway, the transportation facilities of which are, at the present time, pressed to their utmost capacity. As a consequence of the satisfactory results obtained with the pioneer type, the railway has ordered two similar locomotives, and these are now in service and giving excellent results. Incidentally it is stated that this is the first repeat order for turbine-driven locomotives in the world. The original locomotive of 1932 has now run about 215,000 km. (135,000 miles) in slow speed heavy freight traffic, and it is particularly to be noted that the cost of upkeep has been extremely low. To date, the mileage run between general repairs has been 115,000 km. (71,500 miles), whereas the corresponding mileage for reciprocating engines on the same railway is given as between 50,000 and 60,000 km. (31,000-36,000 miles). the three locomotives referred to are illustrated on page 58.

* * * *

The Efficacy of Water Softening

It is sometimes asserted that water softening in locomotive boilers is only a half remedy for the troubles which bad waters bring about, and that by the time the ill effects due to foaming and the cost of treating the water have been taken into account, the benefits claimed have been largely nullified. There are few things in this world that reach perfection, and it would indeed be strange if an exception to this could rightly be made in regard to the process of softening boiler feedwater. That it does, however, bring about marked economies in boiler maintenance, and retain in service engines that otherwise would have to be taken out for costly repairs, has been proved on numerous occasions. This was confirmed by one of those who took part in the discussion on Mr. J. W. Beaumont's paper entitled " Some Suggestions on Steam Locomotive Design " read at a meeting of the Institution of Locomotive Engineers, who stated that some articulated locomotives used on a Chilean railway required new fireboxes after completing 75,000 km., this being due to the water used and not to the design of the locomotives. After incurring a cost of approximately £2,000 each for new fireboxes it was decided to tackle the water problem and instal water softening plants, the result being that the first lot of engines fitted with new fireboxes then did 200,000 km., requiring practically no boiler maintenance during this period; they were still in excellent condition and good for at least another 200,000 km.

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Railway Literature of 1837

Publications of a hundred years ago included the first issue (October 29, 1837) of *The Railway Times*—the first weekly railway newspaper, and since 1914 a constituent of THE RAILWAY GAZETTE. In 1837 Samuel ("Self-Help ") Smiles (subsequently secretary of the Leeds & Thirsk and South-Eastern Railways) published his " Physical Education." Even cartoonists were condescending a century ago to notice the existence of the railway, and in connection with the general election of 1837 a famous Doyle cartoon entitled " Great Western General Booking Office " showed the famous Irish leader Daniel O'Connell as " passenger and traffic manager at the metropolitan headquarters of the new railway." Those who had " lost their seats " were represented as begging him for fresh places. " Gentlemen," he said, " we are all full; but, if you will only wait for the next train, we shall, I have no doubt, be able to accommodate you all with seats." Regarding the more serious publications of a hundred years ago, it may be recalled that George Godwin, the famous architect, published " An Appeal to the Public on the Subject of Railways "; and Cuthbert William Johnson published " The Advantages of Railways to Agriculture," to which his brother, George William Johnson, added " Observations on the General Importance of Railways."

Railway Wages

THE decision of the Railway Staff National Tribunal, which was issued last Monday and is summarised on pages 66-68, is against the claim put forward by the Associated Society of Locomotive Engineers and Firemen for higher pay, a six-hour day, better rates for overtime, Sunday and night duty, and two weeks' annual holiday with pay. The first part of the tribunal's report reviews, at some length, the circumstances leading up to the issue of the tribunal's Decision No. 1 in July last year. On that occasion the A.S.L.E.F. was not party to the claims, and, in its present Decision (No. 2), the tribunal stresses "the special difficulty . . . which has dominated the whole of the present case, viz., that the claim now presented in December by one union representing grades numbering not more than one-fifth of those covered by the machinery of negotiation cannot be isolated from the claims dealt with on behalf of all grades as recently as July last by a decision which remains operative until next August."

The tribunal re-states the considerations which led to the concessions made in July, 1936, and then proceeds to record and comment upon the changes which have since taken place in the companies' financial position, both actual and prospective. In summary, the tribunal says that results since July confirm the view it then took that the movement was likely to continue upward, and points out that the results have indeed so far exceeded expectations. It goes on to declare that "nothing which has happened since July is such as to justify the tribunal in taking the extreme measure of cancelling the decision then given." There is no possibility of misunderstanding these words, and the tribunal uses equally plain language in commenting upon the magnitude of the sum involved in the claim. It says that "if the concessions now asked for were all granted, and similar concessions made to all classes of railway employees, the annual extra cost could not well be less than about £50,000,000. All the earnings of the railways could not suffice for such a sum, in addition to present wages, even if all classes of investors, including debenture holders, were deprived of the whole of their interest and dividends." These words are of striking importance. Indeed, without in any sense attempting to prejudge an issue, they might, perhaps, be thought to denote the tribunal's attitude towards the type of claim which, if successful, would bankrupt the railways. Further, the pronouncement does not lose significance in contemplating the extensive and costly wage programmes which are already being discussed in certain quarters with a view to submission to the companies next March.

In dealing with the special claim for the establishment of a six-hour day for footplate grades, the tribunal declares unequivocally that the cost of such a demand is "clearly prohibitive," and later the report states that no claim involving such a large expenditure could in the present financial position of the railways, or any improved position which can be regarded as possible in the near future, be consistent with the standard and principles indicated in the decisions and reports of the tribunal. The tribunal makes a significant reference to arguments based on the Standard Revenue. It will be remembered that during the hearing of the case last month the railway companies contended that the measure of the remuneration of their capital is their net revenue, and that the test of the adequacy of the net revenue was determined by Parliament when it provided for the fixing of a statutory Standard Revenue, which at present, stands at £51·3 millions. The net revenue for 1935 was only £32·9 millions, a deficiency of £18·4 millions or 36 per cent. The tribunal states, however, that it does not take the Standard Revenue as a criterion by which to consider whether it could endorse a claim or not. A further observation which attracts attention is that "if the present improvement continues railway employees should obtain a share of the improvement without waiting for the large increase in railway profits that would be required before the revenue contemplated in 1921 can be reached." This scrap of hope to the railwaymen will give but cold comfort to the unfortunate railway stockholders, many of whom have received reduced or no dividends since 1929. The tribunal makes certain suggestions with the object of the satisfactory functioning of the machinery of negotiation and in this connection stresses especially the impracticability of the tribunal dealing with claims of a kind which must affect many grades on the application of a single union, and which are brought forward at a different time from that at which the claims of other unions are submitted. The decision is not binding, and the companies and the Associated Society will now proceed to consider it from their respective standpoints.

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Retrospect and Prospect

DURING 1936 the British railways intensified their efforts to meet the requirements of trade and industry, and to stimulate the development of rail travel. These efforts, together with the general improvement in trade, have enabled them to secure an estimated increase in railway traffic receipts of £5,056,000, or 3·3 per cent., compared with the corresponding 52 weeks of 1935. Of this sum, passenger train receipts represented £1,677,000, merchandise receipts £2,555,000, and coal and coke receipts £824,000. While this substantial increase is very gratifying, it is necessary to bear in mind that the gross receipts were more than £25,000,000 below the level of the 1929 figures, while higher costs have been incurred for labour, locomotive coal, and other materials, and substantial additional operating expenses have been necessary for dealing with the larger traffics. The year has been marked by some remarkable steam train performances. The first British streamlined train, the L.N.E.R. Silver Jubilee, completed its first year's working on September 30, during which time it has conveyed 68,000 passengers and completed 278 of its 498 runs before time. The Cheltenham Flyer and the Bristolian on the G.W.R. have also maintained their exacting schedules with remarkable regularity. As to other forms of motive power, the diesel railcar services operated by the G.W.R. have been practically trebled since 1935. On the Southern Railway rapid progress has been made with the electrification of the main lines to Portsmouth via Woking and Guildford, with subsidiary extensions; Woking to Alton; and Staines to Weybridge, involving the electrification of nearly 95 route miles, equivalent to about 242 single track miles.

Freight train services have also been widely accelerated, and there are now 661 express freight trains running during the 24 hours as compared with 338 five years ago. The use of containers was largely developed for giving door-to-door service without intermediate handling, and 11,240 are now available. The registered transit arrangement achieved a record for the number of packages so conveyed; the railway cash-on-delivery service was largely utilised, cartage services were further developed, a steadily increasing business was done in household removals, and about 500 agreed charges were put into operation. Further co-ordination was effected between railway and omnibus services; railway interests in road haulage were extended through the medium of Carter Paterson & Co. Ltd., and Pickfords Limited, and considerable extensions

and accelerations were made in the services of Railway Air Services Limited. Many important improvement works were completed during the year. An extensive re-arrangement of the tracks between Waterloo and Wimbledon, and the installation of colour-light signalling, was affected without interference with traffic. Signalling improvements were completed at Edinburgh (Waverley), Manchester, and Bristol stations. Railway hotels, refreshment, and waiting rooms have been modernised and station property extensively developed for shop sites.

In October, the opening of the Dover—Dunkerque train ferry made direct rail travel between London and Paris possible for the first time, and a well-equipped travel bureau was provided in the *Queen Mary* by the British railways in conjunction with the Travel and Industrial Development Association of Great Britain and Ireland. One of the most important events of the year was the settlement of the rating question, the subsequent passing of the necessary amending legislation, the successful flotation of a loan to reimburse the railways the major portion of their overpayments to the Railway Freight Rebates Fund, and the alteration in the future level of the rebates by the Railway Rates Tribunal. As to the coming twelve months, barring any untoward circumstances the recovery in trade appears likely to continue, the coal export trade should show a material improvement, and the Coronation festivities should increase rail travel. Although costs are rising, a continuance of the present progressive policy of the companies should enable them to make steady progress towards the pre-depression level of 1929.

* * * *

Mr. Ryan on Modernisation

MR. M. F. RYAN, C.B.E., General Manager, Buenos Ayres & Pacific Railway, who recently returned to Buenos Aires after a trip through Africa by air, followed by an extensive tour through Europe, recently gave to *La Prensa* of Buenos Aires an outline of his views on modern transport problems and methods, based on his observations in the various countries he had visited. Mr. Ryan said that after visiting South Africa, Hungary and Germany, he arrived in England, where he had an opportunity to observe the latest developments in transport co-ordination. He pointed out that in Great Britain co-ordination had not killed competition; but, on the contrary, it had demonstrated the advantages possessed by the various types of road vehicle for the transportation of passengers and goods over short distances which could be covered in about an hour's travelling by road. For longer distances the railway had completely regained its supremacy, owing to its rapidity, accommodating tariffs and greater comfort and safety.

As the result of data collected over a number of years, Mr. Ryan stated, his company was planning to put a scheme of modernisation into practice. Roads, he said, were a necessity; so also were the bus, the motor lorry, and now the railcar; but what was needed was the co-ordination of these different modes of transportation into a system which would benefit the public, and bring new zones into touch with the principal lines of communication. With a view to making possible in Argentina what had been achieved in Great Britain—where trains had been speeded up—Mr. Ryan said that his company was planning a number of fast railcars of modern type, and as announced in our issue of November 20, the B.A.P. has since placed an order for Ganz railcars, which had impressed Mr. Ryan while travelling from Budapest to Vienna. These cars are similar to those lately acquired by the Argentine State Railways, and will be suitable for service on the lines of the B.A.P. connecting Mendoza, San Rafael, and San Juan.

In regard to the exportation of fruit to England, Mr. Ryan said that while he was passing through South Africa he had been greatly impressed by the way in which fruit was handled and prepared for export to the United Kingdom. He said that although the quality of the South African product did not come up to that of the fruit from the Argentine provinces of Mendoza and San Juan, it nevertheless had captured the British market owing to its attractive appearance, better presentation and the careful treatment it received in the modern cold storage plant in Cape Town. That installation, which is being extended, will be capable of pre-cooling 4,500 tons of fruit at one time, with cold storage space for a further 3,000 tons in addition. Mr. Ryan said that this was a matter to which Argentine fruit growers and exporters would have to give serious attention, if they wanted to gain the favour of the British consumer and compete in the British market that should be theirs by virtue of the excellent quality of their products.

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Western Australian Government Railways

A FURTHER improvement is shown in the results of working the Western Australian Government Railways for the year ended June 30, 1936. All classes of traffic, except live stock, had their share in bringing about an increase of £134,322 in gross earnings, and although working expenses were greater by £105,373, interest charges were reduced by £13,048, so that the net loss for the year was £41,997 smaller. The net revenue of £958,044 gave a return on capital of 3·71 per cent., against 3·61 per cent. for the previous year, and was the best since the year 1927-28 when the figure was 4·28 per cent. In the country business there was a decrease of 46,950 passenger journeys and an increase in revenue of £2,155, indicative of the greater travel to the Murchison and Eastern goldfields, and a diminution of shorter distance travel. Suburban journeys decreased by 407,901 and earnings by £1,477. Parcels receipts (£146,545) were greater by £8,186, caused principally by an increase in the carriage of bullion. Paying goods tonnage decreased by 24,142 tons, but receipts therefrom improved by £124,045. The decrease in tonnage and ton-miles is wholly accounted for by the small crop harvested, as wheat and other grain, with the exception of second class goods, were the only commodities showing a decrease. In the A, B, C, and numeral class traffic on which the department depends to recoup itself for losses on unremunerative lines, an increase of 50,000 tons was experienced, the goods carried under these headings representing 34 per cent. of the total earnings, compared with 28 per cent. in the previous year and assisting materially in the improved financial results. The increases were due to a general improvement in mining activities, better conditions generally, and the lessening of motor competition effected under the Transport Co-ordination Act, which had first come into force in July, 1934.

Working expenses were increased to the extent of £19,000 by the restoration of normal salaries under the Financial Emergency Act and the higher rates granted under the Railways Classification Board Award of February 15, 1936. The year also included two additional working days in comparison with 1934-35, and the recovery from the road of additional traffic in the higher rated goods which require more handling necessitated increased staff to deal with the business. Increased expenditure was incurred in re-sleepering and on repairs to rolling stock. Under transportation and traffic and

locomotive power the expenditure was affected by the increase of 233,550 train-miles. Some railway operating figures are compared in the accompanying table:—

	1935–36	1934–35
Average miles	4,358	4,359
Train-miles	6,258,437	6,024,887
Ton-miles (paying goods and live stock)	353,011,099	362,251,783
Passengers	12,421,527	12,876,378
Paying goods, tons	2,779,174	2,803,316
Operating ratio, per cent.	72·20	71·95
	£	£
Passenger receipts	564,365	563,687
Goods and mineral receipts	2,398,873	2,274,828
Total earnings	3,446,161	3,311,839
Working expenses	2,488,117	2,382,744
Net revenue	958,044	929,095
Interest charges	1,015,521	1,028,569
Net loss	57,477	99,474

Amongst the general improvements noted in the report are the experimental fitting of a first class sleeping car with a set of auxiliary springs and Isothermos axleboxes in the most recent design of bogie; the conversion of four first class coaches to second class sleeping cars, giving four in lieu of six berths, and also three two-berth compartments. Tenders have been accepted for six diesel-electric railcars, which are being constructed in Great Britain. A few experimental 200 ft. lengths of rail have been formed on suburban lines by Thermit welding. As the work was completed only towards the end of the financial year it is, in the opinion of the Commissioner for Railways (Mr. J. A. Ellis) too early to express an opinion as to its efficacy, but favourable comment has already been received as to smooth running. Orders have been placed for the provision of flashing light signals of the hooded searchlight type at four important level crossings. Good progress has been made with regrading and deviation works, some of which were brought into use during the year under review with resulting improvement in train loads.

* * * *

South Australian Government Railways

OPERATING results for the year ended June 30, 1936, show a reduction of £76,339 in the deficit, as compared with the previous year. This improvement is due to the increase of £221,240 in gross earnings, and a reduction of approximately £30,000 in the total interest bill. Working expenses, however, advanced by £175,918. Additional payments for salary and wages restorations amounted approximately to £55,000, and there was an increase of over £40,000 in maintenance of permanent way, principally due to the fact that a considerable mileage of lines constructed from 20 to 30 years ago is reaching maturity in regard to life of sleepers. There was a further advance of over £7,000 in pension charges. The remainder of the increase is generally due to additional train-mileage, necessitated by the increased revenue. The surplus of earnings over working expenses gave a return of 1·6 per cent. on the capital invested, as compared with 1·5 per cent. for the previous year. Mr. C. B. Anderson, Railways Commissioner, again calls attention to the fact that the railways are burdened with over-capitalisation estimated at £10,800,000, having regard to their earning capacity. A considerable portion of the railway mileage consists of developmental lines which are not commercially paying in themselves, although they render it possible for the lands they serve to produce to their full capacity, and to bring in considerable revenue to the State in rents and taxation. Another factor which makes it difficult to effect any material reduction in the deficit under existing conditions is road competition, although the efforts of the Commercial Branch to retain business and obtain new traffic for the railways are meeting with considerable success.

Railway passenger receipts amounted to £548,577, an increase of £23,693, and railway freight receipts (goods, minerals, and livestock) advanced from £1,853,188 to £2,027,287. Road motor services brought in from passengers £1,479 against £903, from parcels and mails £4,141 against £3,938, and from freight £6,947 against £6,164. Wheat tonnage (610,173) was 55,220 less, and the receipts therefrom fell from £364,033 to £344,554, but the tonnage of minerals rose from 630,431 tons to 705,294 tons and mineral receipts from £357,442 to £444,012. General merchandise receipts improved from £907,733 to £1,005,654, with an advance in tonnage from 889,534 to 980,131. In wool receipts there was an increase of £3,857. Refreshment rooms and dining cars, bookstalls, and other subsidiary services showed a profit of £9,758, as compared with £8,827 in the previous year. Advertising showed a net profit of £2,680. Results are compared in the accompanying table:—

	1935–36	1934–35
Miles open	2,529¼	2,529¼
Train-miles	5,462,146	5,080,319
Rail passenger journeys	17,430,674	16,660,213
Paying rail-borne freight, tons	2,464,711	2,332,581
Average haul, miles	126·07	119·79
Operating ratio, per cent.	79·76	79·88
	£	£
Capital cost of open lines	27,933,205	27,898,092
Gross earnings	2,890,710	2,669,470
Expenses (including pensions)	2,305,709	2,129,791
Surplus	585,001	539,679
Interest, sinking fund, and exchange	1,303,127	1,334,144
Total deficit	718,126	794,465

In the Adelaide Division the welding of rails on the North line into 120 ft. lengths was continued over a length of 1½ miles. Improved crossing warning devices have been provided at a number of crossings, chiefly in the metropolitan area. Tenders have been invited for suitable diesel units for installation in Model 55 and Model 75 railcars. Under the Redhill to Port Augusta Railway Agreement Act, assented to on December 19, 1935, the work of laying the 5 ft. 3 in. gauge line and erecting the necessary accommodation works between Redhill and Port Pirie has been put in hand. The Commonwealth Government agrees to construct and operate a 4 ft. 8½ in. gauge line from Port Augusta to Solomontown, a suburb of Port Pirie, to meet the Redhill line, which is to be constructed and operated by the South Australian Government. The Commonwealth Government will pay South Australia £20,000 per annum for 20 years as a contribution towards that State's financial loss resulting from the construction and operation of the Redhill line.

RAILWAY INFORMATION BUREAUX AT BRITISH INDUSTRIES FAIR.—The British railways have arranged to provide fully equipped railway information bureaux at the three sections of the British Industries Fair to be held from February 15-26, at Olympia and the White City, London, and at Birmingham. Exhibitors and buyers will here have the services of a staff fully competent to deal with any questions or problems regarding railway transport by passenger and freight services. The bureaux at the three centres will remain open for two or three days after the exhibition closes to the public, so that exhibitors may obtain help and advice in connection with the movement of their exhibits. The bureaux will be equipped with telephones and will be in direct communication with all railway depots in the vicinity, enabling the transport requirements of both traders and exhibitors to be dealt with without delay.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

C.P.R. Semi-streamlined Train Services

Carn Brea, Shalford Road, Guildford
December 26, 1936

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Having recently returned from a trip to Victoria, B.C., it occurred to me that your readers might be interested in the progress made this year by the railways in Canada.

TABLE 33
Eastern Time
Heure de l'est

★ C.P. 360	★ C.P. 352	★ C.P. 350	Miles		★ C.P. 349	★ C.P. 359	★ C.P. 351
P.M.	P.M.	A.M.			NOON	P.M.	P.M.
.....	.....	.....	.....	Lv. MONTREAL Windsor Stn. Ar	.....	.....	.....
.....	.....	.....	.....	Lv. Westmount Ar	.....	.....	.....
.....	.....	.....	.....	Lv. Montreal West Ar	.....	.....	.....
§ 7 00	† 5 15	† 7 45	0 0	Lv. Montreal Place Viger Stn Ar	†12 00	§ 6 00	† 8 30
7 17	5 30	8 00	6.1	Lv. Montreal Park Avenue Stn. Ar	11.45	5.45	8.15
.....	.....	.....	.....	Lv. Montreal Bonaventure Stn Ar	.....	.....	.....
c 7 23	e 5 36	e 8 06	9 8	Lv. Bordeaux	d11 38	d 5 35	d 8 08
.....	.....	.....	10 2	Laval Rapides	.....	.....	.....
.....	.....	.....	12 0	St. Martin	.....	.....	.....
.....	.....	.....	12 8	Ar. St. Martin Junc Lv	f11 32	5 30	8 03
.....	.....	.....	.....	Lv. St. Martin Junc Ar	f11 32	5 30	8 03
.....	f 5 47	.....	13 7	Le Cap	f11 28	.....	.....
7 38	5 53	8 19	17 7	St. Vincent de Paul	11 23	5 23	7 54
f 7 44	6 00	f 8 26	22 8	De Sales	f11 17	f 5 17	f 7 48
7 46	6 02	8 28	23 2	Terrebonne	11 15	5 15	7 46
7 51	6 08	8 34	27 0	Mascouche	11 09	5 09	7 40
.....	f 6 11	.....	30 1	Cabane Ronde	f11 04	f 5 04	f 7 35
8 01	6 17	8 43	35 6	L'Epiphanie	10 57	4 57	7 28
f 8 07	f 6 23	f 8 49	39 6	Vaucluse	f10 51	f 4 51	f 7 22
f 8 13	f 6 29	f 8 55	43 2	Lavaltrie	f10 46	f 4 46	f 7 17
8 20	6 37	9 04	48 5	Lanoraie 35, 35A	10 40	4 40	7 11
8 31	6 47	9 15	56 8	Berthier	10 27	4 27	6 58
8 35	6 52	9 21	60 2	St. Cuthbert	10 22	4 22	6 52
8 41	6 58	9 28	65 0	St. Barthelemy	10 15	4 15	6 45
8 50	7 07	9 36	70 5	Maskinonge	10 06	4 08	6 38
8 58	7 14	9 44	74 5	Louiseville	10 02	4 02	6 32
9 06	7 22	9 53	80 1	Yamachiche	9 53	3 53	6 23
f 9 14	f 7 30	f10 02	87 1	Pointe du Lac	9 44	3 44	6 14
9 25	7 40	10 13	95 1	Ar. TROIS RIVIERES ‖ 36 Lv	9 35	3 35	6 05
9 30	7 45	10 18	95 1	Lv. TROIS RIVIERES ‖ 37 Ar	9 30	3 30	6 00
f 9 40	f 7 55	f10 28	101 7	Redmill	f 9 20	f 3 20	f 5 50
9 50	8 04	10 36	107 8	Champlain	9 12	3 12	5 42
10 01	8 15	10 45	114 8	Batiscan	9 02	3 02	5 32
10 09	8 23	10 52	120 0	La Perade	8 55	2 55	5 25
10 19	8 33	11 01	127 2	Grondines	8 45	2 45	5 15
10 25	8 39	11 07	130 3	Lachevrotiere	8 39	2 39	5 09
f10 31	8 45	f11 13	133 6	Deschambault	f 8 32	f 2 32	f 5 02
10 37	8 52	11 20	137 8	Portneuf	8 26	2 26	4 55
10 44	8 58	11 27	142 4	St. Basile	8 18	2 18	4 48
10 51	9 05	11 34	147 1	Pont Rouge	8 10	2 10	4 40
11 07	9 23	11 51	159 3	Belair	7 53	1 53	4 23
11 15	9 30	11 59	165 2	Lorette	7 44	1 44	4 14
d11 23	d 9 38	d12 08	170 5	Caderna	.....	.....	.....
§11 30	† 9 45	†12 15	172 6	Ar. QUEBEC Palais Stn Lv	† 7 30	§ 1 30	† 4 00
.....	.....	.....	.....	Ar. Charny Lv	.....	.....	.....
.....	.....	.....	.....	Lv. Charny Ar	.....	.....	.....
.....	.....	.....	.....	Ar. QUEBEC Palais Stn Lv	.....	.....	.....
.....	.....	.....	.....	Ar. Levis Stn Lv	.....	.....	.....
.....	.....	.....	.....	Lv. Levis (Wharf) Ar	.....	.....	.....
.....	.....	.....	.....	Ar. QUEBEC (Wharf) Lv	.....	.....	.....
§11 30	† 9 45	†12 15	172 6	Ar. QUEBEC Palais Stn Lv	† 7 30	§ 1 30	† 4 00
P.M.	P.M.				A.M.	P.M.	P.M.

Semi-streamlined, air-conditioned, buffet car train service Montreal—Quebec—Montreal, C.P.R.

The enclosed schedule of the semi-streamlined trains of the Canadian Pacific between Montreal and Quebec is evidence of a determination to give the public adequate facilities—*even though they live on branch lines and in very small towns*. For example, it would appear that these six trains cover 172·6 miles in 4½ hours; that they make as many as 33 stops; and that there is no loitering. Speed between stations must be high. Train No. 360 has 6 minutes in which to cover 5·1 miles (St. Vincent de Paul to De Sales); train 352 has 3 minutes in which to cover 3·1 miles (Mascombe to Cabane Ronde) train 352 is allowed 10 minutes to cover 8·3 miles (Lanoraie to Berthier). And it is single track.

In conclusion, I was much impressed by the absence of noise, dirt, and excessive heat on the principal Canadian Pacific Montreal—Vancouver train, due to air-conditioning. And I could not help noticing in the literature concerning this train (The Dominion) the following statement: "If it is humanly possible, the needs and desires of passengers will be supplied. Ask for what you want."

Yours truly,

G. BRIGHT

[These new trains were illustrated and described in THE RAILWAY GAZETTE of October 30 last. It is unlikely that, on an average, more than 3 or 4 of the 7 conditional stops indicated by an "f" in the table are made daily. If we take 3, the average number of intermediate stops made will be 28, involving 29 start-to-stop runs averaging in length fractionally under 6 miles. With a five-minute halt at Trois Rivieres (presumably for water) and 27 other stops each averaging 30-sec. duration, the over-all running time works out at 251½ min., or 8 min. 40 sec. for each six-mile run, entailing a start-to-stop average speed of nearly 42 m.p.h. and good acceleration constantly repeated in all circumstances. This is almost equal to the London—Brighton semi-fast electrics having, say, 7 intermediate 30-sec. (average) stops in the 51 miles and an overall time of 74 min. The 8·8 min. time for the average start-to-stop run of 6·4 miles gives an average speed of just under 44 m.p.h.—ED. *R.G.*]

Unusual "Mixed" Gauge

Warsaw, December 29

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—With reference to the letter from Mr. Rodger L. Simons published in your issue of December 18, regarding mixed gauge between the Swedish and the Finnish frontiers, I think that the writer has possibly overlooked the interesting situation obtaining at the Lithuanian-Latvian-Polish border, where there is from Tarmont in Poland to Dunaberg in Latvia a four-rail mixed Russian and European gauge line for the distance of about 10 miles, while from Dunaberg to the Lithuanian border there is a standard gauge track.

Dunaberg station is one of the most interesting in Europe as it is the only place where may be found Russian-Polish-Lithuanian-Latvian-Estonian and German rolling stock side by side. Apart from this the station possesses no advantages, being deficient in the majority of the amenities of modern stations.

Yours faithfully,

EGERTON SYKES

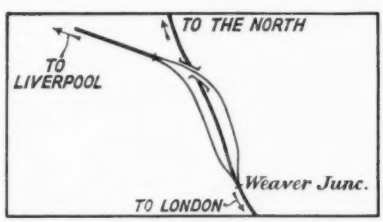
[The international bridge at Tornea, to which Mr. Simons referred, is illustrated on page 60.—ED. *R.G.*]

Flying and Burrowing Junctions

London, January 2

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I read with considerable interest the articles by Mr. S. Barter which you published recently on the subject of flying and burrowing junctions on the Southern Railway, and venture to recall to your mind an early and important application of the principle on the main line of the old L.N.W.R. On the construction of the new direct line to Liverpool via the Runcorn Bridge (opened in April, 1869) the main line to Liverpool diverged at Birds Wood junction from the main line to the north, and, to avoid crossing of important tracks on the level, the up line from Liverpool to the south was carried at this point over the older main line. This was the first use on the old L.N.W.R. of a flying junction, an arrangement that was subsequently adopted at Rugby, Edge Hill, and elsewhere.



Sketch of Weaver junction

Yours faithfully,

NORD-WEST

[The point to which our correspondent refers is officially named Weaver junction. Birds Wood is the name of a signal box on the Liverpool lines adjacent to the actual bridge of the flying junction.—ED. *R.G.*]

PUBLICATIONS RECEIVED

Mechanical World Year Book, 1937.—London: Emmott & Co. Ltd., 28, Bedford Street, W.C.2; Manchester: 31, King Street West. 6¼ in. × 4 in. 360 pp. and diary. Illustrated. Price 1s. 6d. net.—In accordance with annual custom, practically all the data in this pocket book have been brought up to date, and a special chapter has been added on toothed gearing, which forms a treatise based on the most modern practice and applicable to many fields of engineering. There is also a useful section on the properties of beams and rectangular, square and round plates under bending, in addition to sections on boiler construction, superheating, compressors, and machine-tool feeds and drives. Finally, there is that comprehensive series of tables on weights of material sections, and dimensions of threads and drills for which this book has been noted for many years.

Neunzig Jahre Verein Mitteleuropäischer Eisenbahnverwaltungen (90 years of the Central European Railway Association). Special commemorative issue of the *Organ für die Fortschritte des Eisenbahnwesens*, the official technical journal of the association, November 15, No. 22, 91st year. Edited by Dr. H. Uebelacker. Berlin: J. Springer. 36 pp. 9½ in. × 12 in.—On November 10, 1846, some ten Prussian railway companies convoked a meeting to consider certain railway legislation, and the result was the forming of an association for the furtherance of their mutual interests; in the following year its scope was enlarged to include all the railway administrations in the German Confederation, to which Austria then belonged, with the title of German Railway Association. This name had lasted for some 85 years when, in October, 1932, the name "German" was altered to "Central European," to mark more clearly the extent and nature of the association's activities. A certain number of railways outside Germany belonged to it before the war, the outcome of which considerably affected its members. Some then ceased their membership, but the Scandinavian and Swiss lines joined in 1929, and the total route mileage is now 93,876 km. under 110 administrations.

The present issue of the *Organ* is devoted to commemorating the Verein's 90th year, and it is interesting to note that it is itself one year older, having been founded in 1845 by the eminent locomotive engineer of the Taunus Railway, Heusinger von Waldegg, who realised the need in Germany for a good technical journal covering all sides of railway construction. He it was who, independently, invented the same valve gear as the Belgian, Walschaert, and it is often called the Heusinger gear in German publications. The journal was started by him with the aid of a friend, C. W. Kreidel, a publisher at Wiesbaden, where a firm of that name still exists, and it met with an excellent reception. Heusinger was editor until 1855, when he was succeeded by Dr. Scheffler, of Brunswick. In 1846 the Verein formally adopted the *Organ* as its official technical journal; it already possessed another devoted to financial and other aspects of railway working, which still exists as the weekly *Zeitung des Vereins*. The *Organ* is at present issued fortnightly.

Heusinger once more became editor, and remained so till his death in 1886, when Oberbaurat Funk took up the work, with the help of Professor Barkhausen, who succeeded Herr Funk three years later. He was assisted by two engineers, von Borries and Frank, well known in Germany. A few years later a consultative editorial committee was set up, including such prominent names as Gölsdorf, Kohn, Gerstner and others; Herr Barkhausen remained editor till 1922. The finances of the paper were also reformed and placed on a sounder basis.

There are several interesting articles in the present number. Reichsbahnoberrat Mertz deals with the evolution of the various standards and specifications issued by the association on technical subjects, which exerted a great influence in the countries concerned. In the early years they related chiefly to permanent way and rolling stock, but in the course of time station layouts, shunting yards, signals, telegraphs and other matters were covered. Dr. Bloss reviews the work done at the various technical meetings, held at intervals, the proceedings being first issued in a special number of the *Organ* after the Dresden conference in 1865, and gives details of the subjects discussed and their special features. Here again permanent way seems to have been the centre of interest at first, but by the seventies most of the characteristics of railway working were established and the increasing use of electricity is the most noticeable subject thereafter. These special numbers of the *Organ* form a very valuable record of railway engineering progress.

Professor Baumann contributes an account of the effects produced on rolling stock design by the decisions of these conferences. Reichsbahnoberrat Maser, now retired, of Munich, reviews permanent way engineering in the 18 years from 1846 to 1863, as reflected in issues of the journal. The number of recorded forms of rail, rail fastening, fishplate and sleeper is truly astonishing and many, in Herr Maser's view, will still repay study. Professor George Lotter of Breslau discusses the development of the locomotive during the same period, with illustrations of some historic types, principally German or Austrian, but including some French and English, taken from issues of the *Organ* or old text-books. Considerable attention is given to the engines which competed in the Semmering trials. This special number of the *Organ* is to be warmly commended to all who are interested in the evolution of railways. It is printed and produced in the customary clear manner.

L.N.E.R. Tide Tables.—The L.N.E.R. Tide Tables for 1937 have just been issued and may be obtained free from the portmaster at the port concerned. The tables are bound in four volumes of a handy size for the pocket and contain information regarding high tides, depth of water, phases of the moon, and accommodation available at the various docks. The volumes deal respectively with: Middlesbrough dock; Tyne dock and Dunston staithes; the Hartlepools; and Hull, Immingham, and Grimsby.

Scout (Revue des Scouts de France).—The November 20 issue of this periodical is a special railway number of considerable attraction. Articles are devoted to track and signals, steam locomotive design, wheel arrangements and notation (very well described with the help of a double page of 28 locomotive photographs all to an identical scale), electric locomotives, railcars, and models, all most admirably illustrated with photographs and diagrams. The advertisement pages witness to a development of the model railway industry in Paris that appears fully equal in scope to that of this country.

The Transport Diary and Handbook, 1937. London: Industrial Transport Publications Limited, Dudley House, Southampton Street, Strand, W.C.2. 4½ in. × 3½ in. Leather edition 2s. 6d., cloth 1s. 6d. net.—There are several new features included in this year's edition of this compact little pocket diary. Among the new items to be found in the index are, for instance, lighting-up times, cost calculator, drivers' wages, freight calculator, temporary repairs to road vehicles, how to calculate railway rates, and decimal equivalents. All the old features, such as "points on licensing and list of authorities," have been retained and where necessary brought up to date. The diary section is generously arranged with four days to a page. The memoranda section, also, is in no way cramped; indeed, it is sufficiently comprehensive to make provision for notes concerning next December's Christmas boxes. A particularly useful feature of the diary is sixteen pages of sectional maps of Great Britain. Regret need only be expressed that the heavy markings of the roads tend somewhat to make the railways look in comparison a little insignificant. Those engaged in the transport industry who have yet to procure a diary for 1937 will not regret it if they buy "The Transport Diary and Handbook."

Calendars, Diaries, Etc.—Additionally to those mentioned last week, we acknowledge with thanks greeting cards, calendars, diaries, and other tokens from the following:—

Carter, Paterson & Co. Ltd.; New York Central System—Mr. Edward Hungerford; Index Publishers (Dunstable) Limited; Pennsylvania Railroad; Scottish Motor Traction Co. Ltd.; Société Anonyme de Gerence et d'Armement; John I. Thornycroft & Co. Ltd.; Vitrea Drawn Sheet Glass Co. Ltd.

THE SCRAP HEAP

Strange as it may seem, only 2½ ounces of fuel are required to haul a ton of freight one mile in the average train.—*From the Ottawa "Evening Citizen."*

* * *

On the Canadian Pacific Railway approximately 50 per cent. of more than 2,000 locomotives have been in service for from 20 to 30 years, an additional 7 per cent. have seen between 30 and 40 years' service, and more than 3 per cent. have been in service between 40 and 50 years. On the Canadian National more than 1,000 locomotives, or over 40 per cent. of the system's total motive power, have had from 20 to 30 years' service, and 120 locomotives, or 4·5 per cent., have had from 30 to 40 years' service.—*Wm. C. Dickerman, President, Montreal Locomotive Works.*

* * *

ST. PANCRUST AND SHOEBURYNEST

Just before Christmas, writes a correspondent, a friend was travelling from Birmingham to Euston. In the compartment was a very voluble elderly lady who was explaining at length her ailments and past life and ended up by informing those present that as she did not know London at all she must enquire when she got to Euston the way to take to walk to "St. Pancrust" and from there take a train to "Shoeburynest" where her daughter, whose husband was in barracks near there, was meeting her! !

* * *

The Belships Co. Ltd., of 47, Victoria Street, S.W.1, had a happy idea in adopting for its New Year greeting card a "ship caricature" of one of the famous Christen Smith fleet of "Belships" built specially for carrying railway locomotives and rolling stock in assembled condition. This particular drawing appeared originally in the columns of our associated paper, *Shipbuilding and Shipping Record*, on October 15 last as No. 11 of the series of "ship caricatures" by S. E. Beck that our contemporary has been publishing. On the greeting card, acknowledgment is made to *Shipbuilding and Shipping Record*, and the picture bears the caption "ms. *Belpareil* loaded with a very special cargo."

* * *

In 1865 there was manufactured at Prague a beautiful piece of carpeting measuring 14 feet by 20, with an unusual design. This took the form of a map of the railways of Central Europe, and the detail was particularly good. This carpet was presented to the museum at Vienna, and it would be interesting to know if it is still in existence.

* * *

EARLY BUFFET CAR PROPOSAL

The idea of a buffet car service was mooted as long ago as 1846, for the *Bristol Gazette* of April 18, 1846, speaking of a proposal for a railway restaurant, said: "The invention consists in the construction of some newly-formed carriages, so as to constitute a sort of travelling *caffe*, or railway restaurant, to be placed in the rear of the carriages, which are to be so constructed as to open into one another to any extent, enabling waiters to travel along the train, and relieve the *ennui*, so inseparable from railway travelling, by supplies from a locomotive larder at the other end. A bill of fare, showing what the refectory contains, is to be posted in each carriage; so that passengers, first, second, and third, may at any time stay the rage of hunger. Bells are to be at the command of the passengers, to announce their wants to the waiter, who will travel to them along a narrow passage alongside the interior of the carriages constructed for the purpose. Should the proposed plan, which had its origin at Hull, be adopted, railway travelling may be ranked among the beatitudes."

* * *

NIGHT TRAIN PERILS TO WOMEN

A report in *The Sunday Times* states that as a sequel to the discovery of the body of Mme. Garola, a young widow, beneath some rugs in a second class carriage of the Strasbourg—Mentone night express on November 15, the ticket inspector who reported the tragedy has been detained. It is alleged that he concealed the fact that the woman was gagged, which he could not have failed to notice when he tried to wake her, and that he kept the compartment locked and delayed reporting that a woman was either heavily asleep, or else dead "from natural causes," until the last possible moment. Complaints from women of molestation while travelling on this train have been recorded at intervals for some time, and the prosecution at the present enquiry into the death of Mme. Garola claims that such incidents have been occurring for the past two years. The detained inspector alleges that he was instructed by a grey-haired man not to disturb Mme. Garola, but discrepancies have been found between his own account of where he joined the train and his subsequent movements, and the statements of other railway employees.

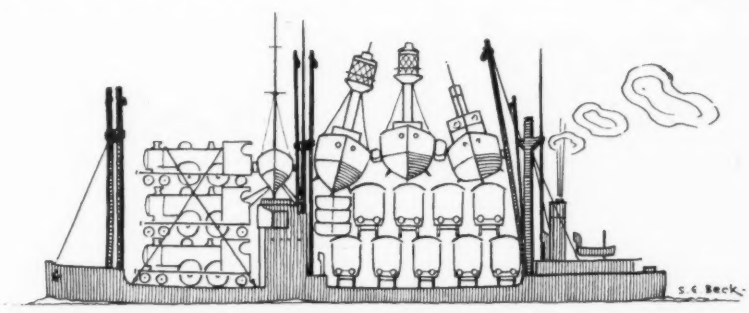
* * *

THE SPANISH CONFLICT FORESEEN

As long ago as 1923 Mr. George L. Boag wrote in his book "The Railways of Spain":—

"Trades unionism in Spain is represented by two main bodies and a number of smaller unions of trade guilds. The General Labour Union (Confederacion de Trabajo) is frankly syndicalist and Marxist. Its organisation is on the lines of a secret society and its potential power is probably greater than is suspected. The General Workers' Union (Union General de Trabajadores), on the other hand, is wholly and entirely governed by socialist doctrines, and its acknowledged head is Pablo Iglesias, who for years was the only socialist member of Congress. To this body the Railwaymen's Federation is allied. To recent activities of the General Workers' Union may be attributed the recent strike of the Barcelona Light & Traction Company's men in Barcelona, in which the men left their work and nearly stopped the whole life of the city for a week, returned to work with certain concessions, and then struck again, apparently without reason. The truth is probably that the union is simply inducing these partial strikes in order to feel its way and train its members, and that immediate partial results are considered as unimportant in comparison with the valuable lessons learned, to be applied when the day arrives for a final demonstration in force. This may be an exaggerated theory, but all the evidence goes to show that there is an organisation working secretly, with its centre in Barcelona, and with or without international affinities, which will at some future date tax all the resources of the country to keep from causing a revolution, not only in the political but in the economic life of the country."

[A Spanish correspondent, who recently called our attention to the prophetic interest of this paragraph in view of the present conflict, also made various comments, with which we deal in an editorial note on page 41.—ED. *R.G.*]



Ms. "Belpareil" loaded with a very special cargo

OVERSEAS RAILWAY AFFAIRS.

(From our special correspondents)

CANADA

Railway Problems

Speaking recently at Montreal, Sir Edward Beatty outlined the lengths to which railwaymen of all grades went to obtain co-operation among themselves, a co-operation the wisdom of which in Canada was discovered not by Parliament but by railway officers. In recent years this spirit had supplanted former competition, and the result of the change had, he said, done more than anything else in North America to prevent the great economic waste caused by unregulated competition in transportation generally.

Continuing, he pleaded for fair play, which the railways had a right to expect, and claimed that the same rules should apply to both road and rail competitors; when this end was secured all forms of transport would, he believed, be better served without economic waste.

Turning to the subject of streamlined trains he was of opinion that there was no room in railway policy for "wild-eyed enthusiasm" over them and other improvements that could not be maintained generally throughout the whole service. Sir Edward urged caution as well as courage in the handling of problems to provide transportation for a nation; improved equipment to obtain publicity, must, he declared, be of such a standard that they could be sure of maintaining it. The financial success of very fast services must be judged not by their direct earnings, but by their effect on earnings generally, thus insuring that it was not secured at the expense of other services that had to be maintained.

UNITED STATES

Large Orders for Rolling Stock

The Southern Pacific Company has recently ordered 14 large streamlined steam locomotives for passenger service and 14 Mallets (4-8-8-2) for freight service, 41 light-weight passenger cars and 2,725 freight cars. The Chesapeake & Ohio Railway has ordered 2,000 freight cars, the Santa Fé 3,000, the Pacific Fruit Express 2,000, and there have been recently a dozen or more scattered orders for smaller quantities. The Santa Fé has ordered 27 locomotives, and plans with them to operate its passenger trains between Chicago and the Pacific Coast with but one intermediate change of engines—at La Junta, Colo., which is 991 miles from Chicago and 1,236 miles from Los Angeles. The Norfolk & Western Railway will build eight additional locomotives of its new high speed Mallet (2-6-6-4) design [described and illustrated in our last issue—Ed. *R.G.*] in its own workshops.

The Southern Pacific, Chicago & North Western and the Union Pacific systems have jointly ordered two 17-car diesel-electric streamlined trains—which will be the largest yet built, each having a 5,400-h.p. power plant distributed through three power cars. A smaller streamliner has been ordered by the Gulf, Mobile & Northern Railroad. The new Pacific Coast diesels have been ordered because of the great demand for accommodation on the trains now in operation, the available space on them being booked solid weeks in advance.

The railways are contributing further to general industrial revival by large orders for steel rails and other track materials. In November and the first week of December alone nearly 700,000 tons of steel rails were ordered.

The Van Sweringen "Empire"

Following the recent death of Mr. O. P. Van Sweringen, Mr. Herbert Fitzpatrick, Vice-President (Law) of the Chesapeake & Ohio Railroad, has been chosen to head the "top" company of the "pyramid." The railways embraced in the combine include the Chesapeake & Ohio; the Erie; the Pere Marquette; the New York, Chicago & St. Louis; and the Missouri Pacific. The "pyramid" is now being investigated by a sub-committee of the Senate, and, as a result, legislation to place restrictions on the "holding company" device is likely. While undue complexity and "pyramiding" doubtless should be avoided, opponents of limitation in the use of the "holding company" point out that it is a legitimate and effective means of achieving railway consolidation and hence should not be prohibited.

Reverting to the Van Sweringens, it may be said—whatever one may think of the desirability of the complexities which they introduced in railway finance—that they, nevertheless, never failed to pick competent railwaymen to manage their properties. The Chesapeake & Ohio; the New York, Chicago & St. Louis; the Erie; the Missouri Pacific—all are recognised as exceptionally well operated and efficient railways.

Repaying Government Loans

Another result of improved railway earnings has been heavy repayments of sums borrowed from the Reconstruction Finance Corporation, the Government lending agency. The New York Central has recently completely repaid its loans, totalling some £3,372,000. Total repayments (including railroad securities sold by the R.F.C. to private investors) now total more than £60,000,000, with less than £80,000,000 remaining to be repaid. Incidentally, the resale by the Government of railroad securities to private investors has developed into a rather lucrative business on its part, a profit in premiums above the purchase price from the railroads of about £1,000,000 having already been realised.

The Future Outlook

The railway unions have given no evidence of any modification of their plan to insist that Congress should pass legislation establishing the 6-hour day, which would increase the hourly wage rate by 33⅓ per cent. Furthermore, the powerful train and engine service "brotherhoods" have announced their intention of demanding an increase in basic rates of pay, and their executives will meet early in January to formulate these demands. With these threats of added expenses, with constantly mounting taxes—particularly with respect to the Government's elaborate social security programme—and with no disposition to curtail the enormous expenditures on highways and waterways which constitute the subsidisation of competing agencies of transport, the lot of the railway manager is not yet a bed of roses, despite the financial improvement that has occurred.

ARGENTINA

Institution of Locomotive Engineers (South American Centre): Annual Dinner

This dinner took place at the restaurant of the Central Argentine Railway, Retiro terminus, Buenos Aires, on November 6, to celebrate the silver jubilee of the parent institution in London. The Chairman of the centre, Mr. O. Steven, Chief of Operating, B.A.G.S. and B.A.W.R., presided, and the principal guests were Mr. J. Hurleston Leche (Counsellor to the British Embassy), Engineer Manuel Garcia Torre (Director-General, Argentine Railways), and Mr. C. Le Maistre (Director, British Standards Institution). Messrs. M. F. Ryan (General Manager, B.A.P.R.), and D. M. MacRae (General Manager, Central Argentine Railway) were also present.

Mr. R. E. Kimberley, Chief Mechanical Engineer, B.A.P.R., proposed the toast of "The Guests." After welcoming Mr. Hurleston Leche, Engineer Garcia Torre and Mr. Le Maistre, he referred to the growth and development of the parent institution, which, he mentioned, now numbered 1,600 members, with centres in Australia, India and South America, as well as the United Kingdom.

Engineer Garcia Torre and Mr. Le Maistre both responded. The former paid a tribute to the British-owned railways in Argentina, and the latter mentioned that he had come out to Argentina in the hope of being of some little assistance to British engineers and

traders in arriving at a common agreement in regard to standards.

The toast of "The Institution of Locomotive Engineers" was proposed by Mr. Ryan, who referred to the beginnings of the parent institution. At the opening of the Manchester centre, he had suggested the formation of one in Argentina, and within a year, thanks largely to Mr. J. G. Mayne (Director, Percy Grant & Co. Ltd.) this had been accomplished.

The toast was replied to by the Chairman, who after briefly reviewing the activities of the current session, thanked the general managers of the British-owned railways for their assistance, especially in connection with the quarterly meetings which were of the greatest value to engineers as well as to the railways themselves. On page 64 we reproduce a photograph taken at this dinner.

CEYLON

The Hammond Commission

The Hammond Transport Commission, which is now sitting, will probably leave Ceylon about the middle of January, by which time, it is expected, it will be able to finish recording all the evidence. In all about eighty witnesses will give evidence. It is understood that the first draft of the report will be made during the return voyage, and that, when ready, the final report will be presented to the Secretary of State for the Colonies who will forward it to the Ceylon Government.

A large number of memoranda on railway and road motor transport has been submitted to the commission by various public bodies and those interested in the railway problem. A notification has been issued stating that it is open to any member of the railway staff to submit a memorandum to the commissioners, stating briefly any opinions or suggestions on the transport problem of the island. The recording of evidence from the public has now begun. Before evidence was heard, however, the commissioners went through a large volume of memoranda that had already been submitted, and decided on the bodies and persons who should be called to give evidence on the various points mentioned by them in their memoranda. The commissioners have completed a tour of the whole railway and have seen some of the routes where rail and road competition is particularly keen.

Coaching Stock Improvements

For some years now it has been the practice of the Government Railway to build all third class railway carriages with floors of Decolite, an ornamental cement, and this material is also used for all lavatory floors. Carriage roofs have always been built with a large air space between the outer roof boards and the inner ceiling, but last year a batch of carriages was built at Ratmalana workshops, in which greatly increased heat insulation was provided in the roofs. The outer roof is of galvanised steel sheets, and inside this is an air space and then a sheet of asbestos with aluminium foil cemented to each side of it. A further air space is provided between this asbestos and the inner ceiling which is of Ranai sheeting. This is an expensive form of roof, but the additional cost is considered to be justified, and if the coaches give satisfaction in service, more similar ones will be built.

Third Class Comfort in Diesel Trains

On the new diesel-electric trains, which are expected to arrive in the island early in 1937, the third class passengers will be provided with fans and seats upholstered with sponge rubber, an entirely new standard of third class passenger accommodation as far as Asiatic countries are concerned. These carriages will also have insulated roofs of the type described above.

With the object of making travelling in railway sleeping berths more popular, the railway administration is introducing cheaper sleeping berth fares, and also return sleeping berth tickets. At present Rs. 5 is charged for a first class sleeping berth, and Rs. 2/50 for a second class berth. The proposal is to charge an extra rupee only in both cases for a return sleeping berth.

SWITZERLAND

Proposed Reorganisation of Tourist Propaganda

The Federal Transport office has now completed a draft project for the reorganisation of Swiss tourist propaganda. The proposed reorganisation will introduce the following main changes. The Federal Railways will retire from any active propaganda abroad for the tourist industry, and will leave the matter entirely in the hands of the Tourist Federation, which will take over all the foreign agencies of the Federal Railways, such as ticket offices and travel bureaux. These offices will be maintained either in their present form or will be converted into publicity offices.

The scheme will have the advantage of unifying all tourist propaganda and of eliminating the duplication of activities and other disadvantages which are inevitable when several independent bodies are engaged in the same kind of work. Other advantages claimed are that henceforth all tourist propaganda will be impartial and will serve the interests of the various groups which have been merged into this one body, and that the project introduces facilities for the adoption of modern developments and the simplification of propaganda activities.

The handing over of the Federal Railway agencies abroad to the Tourist Federation is the proposal which appears to arouse the greatest opposition to the scheme. In this connection it is pointed out that there is no question of the complete abolition of the railway publicity services, which will continue their activities both at home and abroad. So far the railway administration has neither accepted nor refused to accept the scheme.

Further Improvements in November

The consequences of the devaluation of the Swiss franc, which had a slight effect on the Federal Railways results for October, became more apparent in November. The total receipts for passenger and goods traffic amounted to fr. 23,588,000, or 3·6 per cent. less than in November, 1935, but as working expenses were again considerably reduced and showed a saving of 7·2 per cent. over the previous November, the net receipts were, for the first time, higher this year than in the corresponding month of 1935, the increase being fr. 459,729.

Christmas and New Year Traffic

Winter sport traffic for the Christmas and New Year holidays will involve considerable movements of special trains from abroad, and at the time of writing the following specials have been arranged for :

December 23 and 24—	
From Paris via Basle	9
,, ,, ,, Delle	1
,, ,, ,, Vallorbe	5
,, Boulogne via Basle	4
,, ,, ,, Delle	6
,, Ostend via Basle	3
,, Belgium via Basle	3
,, Holland via Basle	2
December 29—	
From Boulogne via Basle	2
,, ,, ,, Delle	3
December 30—	
From Ostend via Basle	3

The trains from Boulogne and Ostend are, of course, for English traffic exclusively.

FRANCE

Increasing Railway Deficit

During the Budget debate in the Chamber of Deputies, it was stated that the railway deficit in 1935 amounted to fr. 4,400 million and that the accumulated deficit for recent years was 24,000 millions. For 1936 the deficit is estimated at 5,000 millions and for 1937 at 7,000 millions. The rapid growth of the deficit for these two years is due to the additional expenditure involved by the application of the new social laws. Rises in wages, indemnities to employees for increased living and housing costs, higher prices of materials following increased costs of production throughout the country, the application of the 40-hr. working week and greater expenses consequent upon the devaluation of the franc are all combining to increase the expenditure of the railways.

In the view of the Finance Commission of the Chamber the present situation cannot be permitted to continue; there must be a complete reorganisation of the railways. At the same time

the Government cannot undertake to repurchase the various systems, as the lines automatically become State property in a few years when the concessions to the companies expire. On the other hand, it is pointed out that the deficit is in part offset by the tax revenues and services received from the companies. The question of rail and road co-ordination has also to be solved.

Reorganisation of Railways

Already the Government has undertaken to submit to Parliament before March 31, 1937, a plan for reorganisation, and M. Bedouce, Minister of Public Works, stated in the debate that Decrees for enforcing more effective financial control of the railways are also in preparation with a view to immediate application. He added that a solution of the railway problem may be facilitated by the increased traffic receipts, which since July have continued to show gains in comparison with 1935. If these increases continue in 1937, the deficit may be substantially diminished, though it is too great to be eliminated entirely.

One of the Government's financial measures relative to the railways has aroused a storm of protests from shareholders. This is the proposal to appropriate 50 per cent. of the revenues derived by the companies from their properties, which will not revert to the State on the expiration of the railway concessions. The shareholders protest that they are thus deprived of half the revenues from which their dividends are paid. They point out that the State from 1921 to 1934 inclusive received fr. 33,000 million in taxes and service contracts, whereas the railways cost the budget only 11,000 millions including the deficit charges. The State thus made a profit of 22,000 millions out of the railways, during that time; the guaranteed dividends paid to shareholders amounted to only fr. 1,700 million.

Cheap Fares Bring Increased Traffic

Cheap fares for holiday and Sunday passenger traffic brought large increases in railway receipts during the summer months. The growth in such traffic was especially marked on the State Railways, and was largely aided by the fast train services introduced in the summer timetables last May. The number of cheap return tickets available on Sundays only, issued in the months of June, July, and August rose from 357,000 in 1935 to 515,000 in 1936, an increase of 44 per cent. Special Sunday excursion trains from Saint-Lazare on August 23 brought receipts of fr. 165,000 against fr. 125,000 in 1935, and on August 30 of fr. 134,000 against fr. 57,000. Popular holiday tickets, issued under the new paid-holiday law, numbered 88,000 and brought in fr. 7,400,000. From July 22 to August 15, the holiday trains organised for the Agence Bonnet numbered 41, against 30 in 1935 and the receipts were fr. 3,916,000 against fr. 2,657,000, an increase of 47 per cent. Many additional trains were run at holiday periods.

Growth of General Traffic

Railway traffic generally continues to increase. For the week ended December 1, the total receipts were 13·40 per cent. greater than in the corresponding week of 1935. Passenger revenues amounted to fr. 39,340,000 against fr. 35,252,000, an increase of 11·59 per cent., while goods receipts were fr. 161,508,000 against fr. 141,871,000, an increase of 13·83 per cent.

MANCHUKUO

Modern S.M.R. Equipment

The 100-lb. rails which for some years have been laid in the Dairen-Ssuchiatun (near Mukden) section of the S.M.R. are to be replaced with 120-lb. material, to carry the faster and heavier traffic now running. The new rails will be rolled at the Showa steel works of the S.M.R., and the cost of this 300-km. length of relaying is estimated at Y. 6,000,000 (£353,000); the work will begin next spring and be spread over five years.

Seven new streamlined locomotives for the Dairen-Hsinking section have recently been supplied by the Kawasaki locomotive works in Japan. They are designed for speeds of 130 km. (80 m.) p.h.

TURKEY

Oriental Railways Taken Over

On January 1 the Turkish Government formally took over the undertaking (concession, rolling stock, &c.) of the Oriental Railways Company, and thus completed the nationalisation of all the main-line railways in the country. During the past few years the Government has gradually acquired all the concessioned lines in Asiatic Turkey, but, on the European side of the Bosphorus, the railways have remained until now in the hands of the Soc. des Chemins de fer Orientaux, a French company with headquarters in Paris. During 1936 negotiations have been in progress for taking over this small but important system of 338 km. (210 miles) of standard gauge line which forms the last section of the Orient Express route to Istanbul. The price at which the negotiations were concluded is reported to be £T6,000,000 (roughly £1,000,000 at current rates of exchange).

Bosphorus Train Ferry Envisaged

The Government is now studying the question of improving communication between the European and Asiatic sections of its railway system by establishing a train ferry across the Bosphorus. This would enable through carriages to be worked from all the standard gauge railways of Europe as far as the Iraq frontier.

INDIA

Fire on the Imperial Indian Mail

An outbreak of fire occurred in one of the mail vans attached to the Imperial Indian Mail that left Bombay for Calcutta on December 11, shortly after 11 p.m. When about 400 miles from Bombay, a mail sorter noticed smoke coming from the leading mail van, and immediately pulled the alarm signal so that the train stopped near Charkhera, about 40 miles short of the next scheduled stop at Itarsi. The train staff uncoupled the burning van, a task of considerable difficulty, and shunted it into a siding, where a volunteer party, consisting of the train and station staff and hands from another train that was stopped out of course, then proceeded to retrieve as many bags of mail as possible from the conflagration. After long and strenuous efforts with axes and bars, a sufficiently big opening was made in the van to haul out 100 bags, but it was impossible to do anything further and the van was soon completely burnt out.

Sketch map of Turkey in Europe showing the Oriental Railways

BRITISH RAILWAY STATISTICS

"The Railway Gazette" monthly table for Sept., 1936, as compared with Sept., 1935, compiled from the Ministry of Transport Statement No. 202

Description	Great Britain*	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.
PASSENGER TRAIN TRAFFIC—					
Number of pass. journeys (ex. season ticket holders)	108,206,590	8,102,719	16,285,004	26,596,162	18,923,754
Increase (+) or decrease (−)	+ 4,882,466	− 60,162	+ 524,267	+ 1,256,773	+ 623,725
Passenger receipts (excluding season ticket holders)	£4,981,765	£661,464	£1,021,545	£1,635,829	£1,081,760
Increase (+) or decrease (−)	+ £276,009	+ £26,996	+ £54,218	+ £106,593	+ £53,053
Season ticket receipts	£958,643	£67,677	£172,819	£244,786	£314,759
Increase (+) or decrease (−)	− £53,817	− £6,243	− £7,465	− £18,553	− £11,712
Parcels and misc. traffic receipts (excluding parcels post)	£1,073,951	£195,494	£320,168	£409,530	£130,193
Increase (+) or decrease (−)	+ £30,870	+ £3,028	+ £13,464	+ £13,941	+ £1,700
FREIGHT TRAIN TRAFFIC—					
Freight traffic (tons) (excluding free-hauled)	21,335,924	5,072,449	9,733,776	10,071,867	1,269,147
Increase (+) or decrease (−)	+ 403,159	+ 253,486	+ 311,961	+ 341,040	+ 2,716
Net ton-miles (excluding free-hauled)	1,254,691,618	231,578,997	419,108,294	516,202,888	54,478,425
Increase (+) or decrease (−)	+ 59,345,282	+ 12,443,599	+ 25,165,755	+ 20,727,397	+ 1,109,137
Average length of haul (miles) (excluding free-hauled)	58·81	45·65	43·06	51·25	42·93
Increase (+) or decrease (−)	+ 1·71	+ 0·18	+ 1·25	+ 0·33	+ 0·79
Freight traffic receipts	£7,015,069	£1,207,000	£2,260,000	£2,936,000	£393,083
Increase (+) or decrease (−)	+ £299,171	+ £50,500	+ £120,000	+ £106,000	+ £13,341
Receipts per ton-mile	1·342d.	1·25d.	1·29d.	1·37d.	1·73d.
Increase (+) or decrease (−)	− 0·006d.	− 0·02d.	− 0·01d.	− 0·01d.	+ 0·02d.
Freight train-loads : Average train-load (tons)	125·03	131·40	129·53	123·47	102·55
Increase (+) or decrease (−)	+ 0·56	+ 1·29	+ 1·16	− 0·22	+ 1·47
Net ton-miles—					
Per train engine-hour	978·10	1,036·87	1,027·87	946·25	804·06
Increase (+) or decrease (−)	− 25·54	− 12·56	− 11·77	− 48·12	+ 9·74
Per shunting-hour	869·61	792·64	944·00	913·90	564·24
Per total engine-hour	460·34	449·23	492·08	464·90	331·57
Net ton-miles per route-mile per working day	2,749	2,707	2,912	3,263	1,169
Increase (+) or decrease (−)	+ 131	+ 147	+ 169	+ 127	+ 32
Wagon-miles. Total	369,687,958	66,444,030	127,268,670	155,612,555	18,287,760
Increase (+) or decrease (−)	+ 13,892,414	+ 2,964,705	+ 5,878,679	+ 4,675,352	+ 470,724
Percentage of loaded to total	67·21	68·64	64·69	68·80	66·48
Wagons per train. Total	34·77	35·08	35·21	34·76	32·33
Increase (+) or decrease (−)	− 0·13	+ 0·02	− 0·05	− 0·38	+ 0·65
Loaded	23·37	24·08	22·78	23·91	21·49
Empty	11·40	11·00	12·43	10·85	10·84
Train-miles. Coaching—Per train-hour	15·28	14·29	14·50	14·65	17·75
Per engine-hour	12·12	11·31	11·13	11·12	14·53
Train-miles. Freight—Per train-hour	9·19	9·59	9·30	8·93	9·72
Per engine-hour	3·68	3·44	3·84	3·77	3·20
Engine miles. Total	48,758,886	7,686,208	13,351,813	18,252,890	6,494,467
Increase (+) or decrease (−)	+ 1,286,793	+ 212,457	+ 390,346	+ 549,502	+ 85,032
Mileage run by engines. Total train-miles—					
Coaching	24,852,558	3,407,347	5,697,117	8,226,034	4,789,390
Freight	10,631,970	1,894,151	3,614,962	4,477,023	565,733
Engine-hours in traffic. Total	5,132,058	876,668	1,521,638	2,005,715	525,500
Increase (+) or decrease (−)	+ 186,643	+ 28,396	+ 56,434	+ 91,995	+ 6,186
Shunting miles per 100 train-miles—					
Coaching	7·37	6·90	6·66	7·86	8·24
Freight	71·47	82·57	67·41	66·12	95·62

Passenger Traffic Statistics: Number of journeys, receipts, and receipts per journey (excluding season ticket holders)—September, 1936

Subject	Great Britain	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.	Cheshire Lines	Liverpool Overhead	L.P.T.B.†	Mersey
Full fares—									
Pass. journeys	31,693,760	774,632	1,197,603	1,594,770	2,907,415	17,063	152,414	24,178,141	78,542
Gross receipts	£1,051,223	£104,917	£167,285	£173,732	£249,930	£3,342	£1,545	£332,402	£1,400
Receipts per pass.	7·96d.	32·51d.	33·52d.	26·15d.	20·63d.	47·01d.	2·43d.	3·30d.	4·28d.
Reduced fares—									
Excursion and week-end—									
Pass journeys	45,085,402	4,935,256	10,345,904	16,724,209	9,320,386	437,638	110,778	1,427,400	611,178
Gross receipts	£3,116,413	£461,966	£697,979	£1,204,554	£637,210	£28,114	£1,188	£33,067	£9,375
Receipts per pass journey	16·59d.	22·47d.	16·19d.	17·29d.	16·41d.	15·42d.	2·57d.	5·56d.	3·68d.
Workman—									
Pass. journeys	26,848,106	1,829,039	3,580,450	6,989,835	5,763,692	241,212	196,556	7,126,782	212,046
Gross receipts	£396,290	£27,368	£59,246	£114,389	£96,589	£4,216	£1,607	£79,916	£1,933
Receipts per pass. journey	3·54d.	3·59d.	3·97d.	3·93d.	4·02d.	4·19d.	1·96d.	2·69d.	2·19d.
Other—									
Pass. journeys	4,541,299	554,874	1,150,720	1,271,328	929,761	82,795	43,357	412,890	12,762
Gross receipts	£377,667	£56,964	£88,003	£125,090	£95,475	£4,643	£275	£3,716	£200
Receipts per pass. journey	19·96d.	24·64d.	18·35d.	23·61d.	24·65d.	13·46d.	1·52d.	2·16d.	3·76d.
Total—									
Pass. journeys	108,206,590	8,102,719	16,285,004	26,596,162	18,923,754	778,870	503,105	33,145,213	914,530
Gross receipts	£4,981,765	£661,464	£1,021,545	£1,635,829	£1,081,760	£40,483	£4,615	£449,101	£12,909
Receipts per pass.	11·05d.	19·59d.	15·06d.	14·76d.	13·72d.	12·47d.	2·20d.	3·25d.	3·39d.

* All standard gauge railways † Includes passengers originating on the railway undertakings, and on the Whitechapel and Bow Joint Railway

CHARGING OF SAUSAGE AND COOKED MEAT TRAFFIC

Railway Rates Tribunal dismisses an application from important producers for a lower scale of charges

A SOMEWHAT unusual case concerning rates for the conveyance of sausage, bacon, lard, cooked meat, and kindred traffics has recently been decided by the Railway Rates Tribunal at the instance of C. & T. Harris (Calne) Limited and eleven associated firms. These firms manufacture the commodities mentioned at various places in England whence they forward them, largely by passenger train, to stations in Great Britain, ports in Great Britain and Ireland, and to the Channel Islands. The substance of their application to the tribunal was that the railway charges now paid are excessive and unjust, and for this reason they sought approval for a new scale of exceptional charges; these were subject to certain conditions, the most important of which was that if the combined traffic forwarded by these firms at the proposed scale proved less than 10,000 tons per annum, payment would be made as for 10,000 tons. The circumstances which gave rise to this application are that C. T. Harris (Calne) Limited and eight associated firms have since May, 1932, been charged a flat rate of 74s. 8d. a ton for the conveyance by railway of bacon, lard, dripping, &c.; and 109s. 2d. a ton for sausages, cooked meats, butter, &c.; while the remaining three firms have been paying the passenger train rates applicable to the general public. C. T. Harris has been negotiating with the four main line companies for some time with a view to agreeing an average charge under the provisions of the Road & Rail Traffic Act, 1933, for the whole of its traffic, but the parties have been unable to agree as to the actual rates which should be applied to the traffic for the purpose of calculating the agreed charge.

Evidence was given during the hearing that agreed charges have already been introduced for similar traffic forwarded by the firms' competitors, but as the applicants were unable to show that these had affected their business detrimentally, they asked the tribunal to approve a scale of exceptional rates, lower than the public scales generally in operation, as a preliminary to the railway companies calculating an agreed charge covering the whole of their traffic. Among the reasons advanced for the approval of the proposed scale was the fact that while the flat rates already in operation related to an annual minimum of 7,000 tons, the applicants were prepared to bring three additional firms into the arrangement and guarantee to forward 10,000 tons per annum. In giving judgment, the tribunal pointed out that the flat rate of 74s. 8d. a ton was sanctioned on July 12, 1932, *i.e.*, before the decision of the Court of Appeal was given on May 31, 1933, to the effect that flat or average rates were contrary to the then existing statutes. It was therefore extremely doubtful whether the companies were entitled to continue charging a figure which the tribunal had previously approved in excess of their authority. Further, although the flat rate of 109s. 2d. was mentioned as being part of the arrangement when the lower rate received the approval of the tribunal, assent was not sought for it, and, in fact, it was still unauthorised. In all the circumstances, therefore, the tribunal held that both flat rates were *ultra vires* the companies, and thus it was irrelevant for them to consider whether the charges were excessive or unjust. Thus the only question at issue was whether the authorised exceptional rates now in operation are excessive. On this point the applicants had urged that the revenue of the companies would be better if they adopted the new scale proposed by the firm, than if they continued to impose the existing charges, as, failing the introduction of the reduced scale, the firm proposed to develop the use of road transport. The tribunal declined to accept this contention, however, and intimated that it was not prepared to impose on the railway companies an obligation to reduce their charges on the ground that diversion of traffic is threatened.

The tribunal also held that if the proposed scale was fixed for the applicants' traffic, the existing published charges could not be maintained for other traders without breach of the undue preference and undue prejudice provisions of the relative Acts, and thus the companies would experience a serious loss of revenue in other directions. The applicants urged that the new scale would apply only to those traders who were able and willing to guarantee 10,000 tons a year; the tribunal dissented from this view and stated that it knew of no authority for the proposition that a large annual tonnage forwarded by one trader is a justification under the Railway and Canal Acts for giving that trader lower charges than his competitor sending a small annual tonnage, where the difference in charge is not related to any saving in cost to the railways resulting from the traffic of the preferred trader being greater than that of the prejudiced trader. Finally, after reviewing the whole of the evidence, the tribunal indicated that there were no circumstances which justified the fixing of exceptional rates for the applicants' traffic lower than the rates in force for similar traffic forwarded by other traders, and the application was dismissed accordingly.

Weight Reduction in Rolling Stock

Our American contemporary, the *Railway Mechanical Engineer*, considers in its November issue the important question of weight reduction in passenger rolling stock. It calls attention to the fact that in the coaches of the Hiawatha train recently built for the Chicago, Milwaukee, St. Paul and Pacific, changes in material and in details of construction have effected a reduction in weight from about 56 to 46 tons, a saving of 10 tons per vehicle. With the exception of the stainless steel coach of the Santa Fe, and the aluminium alloy coaches of the Baltimore & Ohio Royal Blue train, these latest cars are the lightest vehicles, fully equipped for long distance service, which have yet been built to dimensions interchangeable with present U.S.A. standards, and it is to be noted that all these weights include air-conditioning equipment. Prior to the advent of new materials such as the strong aluminium alloys, stainless steel, and the new alloy structural steels, few, if any, passenger cars for main line service in the United States have been built which do not weigh well over 50 tons. A number of relatively short coaches measuring 62 ft. to 63 ft. over the body have been built to weights of 52 to 56 tons, and with a few notable exceptions cars of 70 or more ft. in length have weighed from 65 to 80 tons. Not only have the new materials therefore resulted in improvements in weight saving, but they have also stimulated a new interest in refinements of design in other directions.

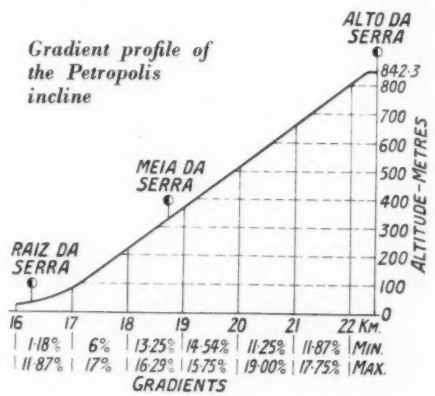
PETROPOLIS INCLINE, LEOPOLDINA RAILWAY, BRAZIL

A description of the principal engineering and operating features of this interesting rack-worked metre gauge line

IN THE RAILWAY GAZETTE of March 17, 1933, we published some brief notes upon this line in connection with its jubilee and the opening of the new station at Petropolis. But as it is a particularly interesting incline section from the operating and engineering points of view, it merits a fuller description of the problems involved. In the four instances in which Brazilian railways have, in the absence of practicable detours, been forced to breast formidable mountain barriers near the coast, three distinct methods of traction have been adopted, namely: (i) cable-operation between Piassaguéra and Alto da Serra on the Santos-São Paulo line, São Paulo Railway; (ii) the Petropolis and Therezopolis rack systems of the Leopoldina and Central Railways respectively, and (iii) the centre rail of the Friburgo incline on the Leopoldina Railway, used for braking on the descent only.

Engineering Features

The Petropolis incline starts at Raiz da Serra station, 30·68 miles from Rio, and terminates at Alto da Serra



(34·45 miles); its total length is thus 3·77 miles, and from an initial height of 101·6 ft. above sea-level, it climbs to 2,758 ft., a vertical rise of 2,656·8 ft. As may be seen from the accompanying profile, the average gradient over the entire incline is 1 in 7·5, or 13·3 per cent., with a maximum of 1 in 5·3, or 19 per cent. over a distance of 131 ft. and the radius of the sharpest curve is 5·17 ch. The altitude of Petropolis itself, which is 1·8 miles beyond Alto da Serra, is 2,663·4 ft. and it is approached by a falling grade from the latter station averaging 1 in 94.

The track is single, but crossing facilities are provided 1·48 miles from the foot, at Meio da Serra. Flat-footed 75-lb. rails are used, with 6-hole angle-type bridge fish-plates. The sleepers, laid in earth ballast, are spaced at one-metre intervals, this spacing being maintained by longitudinal channel-irons fixed on both ends of the sleepers to prevent creep. The rack rails, which are 9·83 ft. long, are either straight or curved to a radius of 7·45 or 8·95 ch., and are fixed on cast-iron chairs bolted to the sleepers; the Riggenbach rack system is employed, all rack materials being imported from Switzerland.

Of the various engineering works, the reinforced concrete underline bridge at km. 54 may be mentioned. It is 103 ft. 4 in. long with a centre span of 59 ft. 1 in., and two end cantilevers of 19 ft. 8 in. and 24 ft. 6 in. This bridge, which we illustrate, is of somewhat novel design, being a rigid frame articulated at the feet of the piers. It was built shortly after the severe cloud-burst on March 20, 1930, when thousands of tons of rocks, trees, &c., were brought down the mountain-side, destroying the old 25 ft. span girder bridge which it replaces, and approximately 230 ft. of track. When this bridge was tested a maximum vertical deflection of 0·1 in. was registered under a load of three engines coupled together. (The normal traffic load is only one engine and two vehicles). Subsequent tests at intervals have given equally satisfactory results.

Other engineering works on the incline include a 164-ft. stone arch viaduct 82 ft. high, known as Grota Funda; a 66-ft. stone arch viaduct 36 ft. high, and numerous culverts, stone side drains, &c. Efficient drainage is of paramount importance, in view of the heavy rains which fall in the wet season, usually from November to January inclusive.

Motive Power

To work the incline, 19 rack engines are maintained, and a 20th is building at Alto da Serra shops. In the case of locally-built engines, such parts as boiler, cylinders, rack spur-wheels, gearwheels and pinions, connecting-rods, injectors and gauges are imported finished; wheel-centres, axles, tyres and frame-plates are imported rough and finished in the shops, and all other parts are made at Alto da Serra. Locomotive No. 13 was built in this way, the remaining 18 being of Swiss or German make, supplied by the Swiss Locomotive and Machine Works, Winterthur, and the Kessler Maschinenfabrik Gesellschaft, Esslingen, respectively.

The 20 locomotives are of one standard type having a single rack spur-wheel and a leading and a trailing carrying axle. They each weigh roughly 26 tons in working order. Twelve of them use saturated steam, and have $13\frac{3}{4}$ in. by $19\frac{3}{4}$ in. cylinders, and 8 have superheaters, and $14\frac{3}{16}$ in. by $19\frac{3}{4}$ in. cylinders: boilers in all cases are pressed to 195 lb. per sq. in. They are designed to propel a maximum passenger load of 32 tons at a speed of 12 km.p.h. up the incline, the maximum freight loading being 35 tons, with an extra minute allowed for each kilometre. Power is transmitted to the rack spur-wheel by an intermediate driving shaft geared at a ratio of 2 to 1. These driving shafts are heavily stressed, and at one time gave lubrication troubles, which have, however, now been eliminated by means of forced feed lubrication. Owing to the difficulty of finding a steel which will stand up to more extended service, actual experience necessitates the withdrawal of driving shafts after only 40,000 km. running in the rack.

The descent of the incline (for which a maximum loading of 32 tons an engine is laid down, irrespective of the type of train) is made chiefly by the retarding action of the Le Chatelier counter-pressure brake, the principle of which is as follows: as the engine approaches the main descent, the valve-gear is put into reverse, clean air is sucked in by the pistons through two independent orifices, and at the same time the driver turns on a water-jet, which plays on to the air-stream, the wet air being compressed and blown through a discharge pipe, culminating in a control-valve and silencer, from which it issues in the form of steam. The front axle of each engine also carries

a floating spur-wheel engaging with the rack and carrying a pair of cast steel drums; this is an auxiliary brake, and in practice is used only for shunting or in the event of a defect in the Le Chatelier brake. A third brake is fitted to the disc-cranks of the driving shaft, and is of the band type lined with hardwood blocks; this is a very powerful brake, and is intended only for holding a stationary train on the rack. All passenger and freight vehicles working on the incline have one axle (the leading one on the ascent and the trailing one on the descent) fitted with a floating spur-wheel and drums carrying hand-operated brake-gear, each vehicle being manned by a brakesman whose duty it is to apply these hand-brakes during the descent.

On reaching the bottom of the incline, rack engines pass through the shed, and are watered and fuelled; the water from the *serras* in the vicinity is nearly pure, so that a month or more between wash-out days is the normal period. As regards fuel, for a full load on the ascent, a fire of 25 to 30 blocks of Crown patent Cardiff briquettes (each weighing about 23 lb.) is made up; generally, however, this is not quite sufficient to reach the summit, 3 or 4 more blocks being broken up and sprinkled over the fire, so as to give the locomotive extra impetus for the culminating stretch of 19 per cent. grade. Fuel consumption averages 95·7 lb. a mile for the saturated steam and 88·7 lb. a mile for the superheated engines.

Traffic Problems Involved

Traffic on the incline is very heavy, as, apart from the booked passenger trains—16 on summer and 13 on winter week-days, with 14 on Sundays and holidays in both seasons—there are always quantities of goods vehicles waiting to be worked up and down in the available intervals. As Petropolis is an ideal summer resort for Rio business men, many of whom reside there from the beginning of December to the end of March, the problem of providing sufficient coaches for the upward evening and downward morning services during this period is acute, accentuated each week-end by the brisk movement on Sundays, when crowds of Rio inhabitants seek the cool of the hills for a few hours. It is not uncommon, during periods of exceptionally hot weather, for trains at the busy times of the day to be made up to 15, 16 or even 17 first class coaches and a van, necessitating 8 or 9 sections on the incline, and in the summer of 1929-30, a record was established with the 7.35 a.m. train from Petropolis due in Rio at 9.10 a.m., which, on two Monday mornings, came down with 19 firsts and a van, 10 sections in all. As there are only 40 to 45 first class rack apparatus coaches—the actual number depending on the proportion under repair—available at any one time, the operating staff of the Traffic Department has to be particularly alert on these occasions, and it is frequently necessary to attach several empty vehicles to trains in one direction or another, or even to form special trains consisting entirely of empties, so as to have sufficient at whichever end they are next required.

The timing of the majority of the Rio-Petropolis trains is 1 hr. 35 min. in the downward and 1 hr. 40 min. in the upward direction for the complete run of 36·25 miles. Of this total, 25 and 30 min. are taken up in the descent or ascent of the incline, apart from the time required for breaking up and assembling the trains at each end. These latter allowances are framed in such a way as to permit of time-keeping with trains up to about 9 or 10 vehicles (5 sections), but whenever this load is exceeded, and in spite of the precision with which locomotive and traffic staffs have been trained to carry out the various shunting and marshalling operations, a few minutes are inevitably lost, as, not only are the 25 and 30 min. incline schedules rigid minima, but intervals of 100 m. (roughly 330 ft.) have to be maintained between sections all the way up and down.

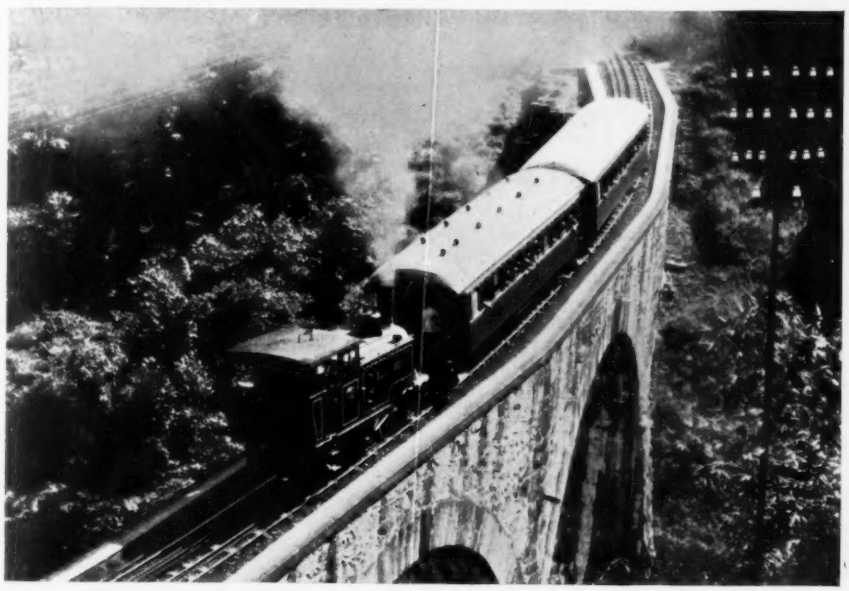
Some of the passenger trains which traverse the incline proceed to or from stations beyond Petropolis, among them the day expresses from Rio to Ponte Nova and Carangola (viâ Entre Rios) and *vice-versâ*, and also the bi-weekly night-trains from Rio to Carantinga and Manhuassú and *vice-versâ*; the sleeping cars for the latter services are attached and detached at Petropolis. A curious feature of operation is involved in the case of these long-distance trains, the present Petropolis station having been built in such a confined space that through working is impossible, with the result that trains bound for the interior have to back out of the station, after doing their work there, until clear of the entrance-points, and Rio-bound trains have to run ahead, pass over the same points, and then set back into the platform.

Popularity of Travel over the Incline

In spite of the increase in the number of motorcar users, and the facility these have enjoyed since August, 1928, in the shape of a reinforced concrete road between Rio and Petropolis, passenger traffic on this stretch of the Leopoldina Railway is well maintained, the total number travelling on it in 1934 (excluding passengers destined for, or proceeding from, stations beyond Petropolis) amounting to 735,600, the highest figure since the last pre-crisis year (1929), when 860,800 were carried. As the bulk of these are first class passengers, many of the Rio-Petropolis trains have no second class accommodation.

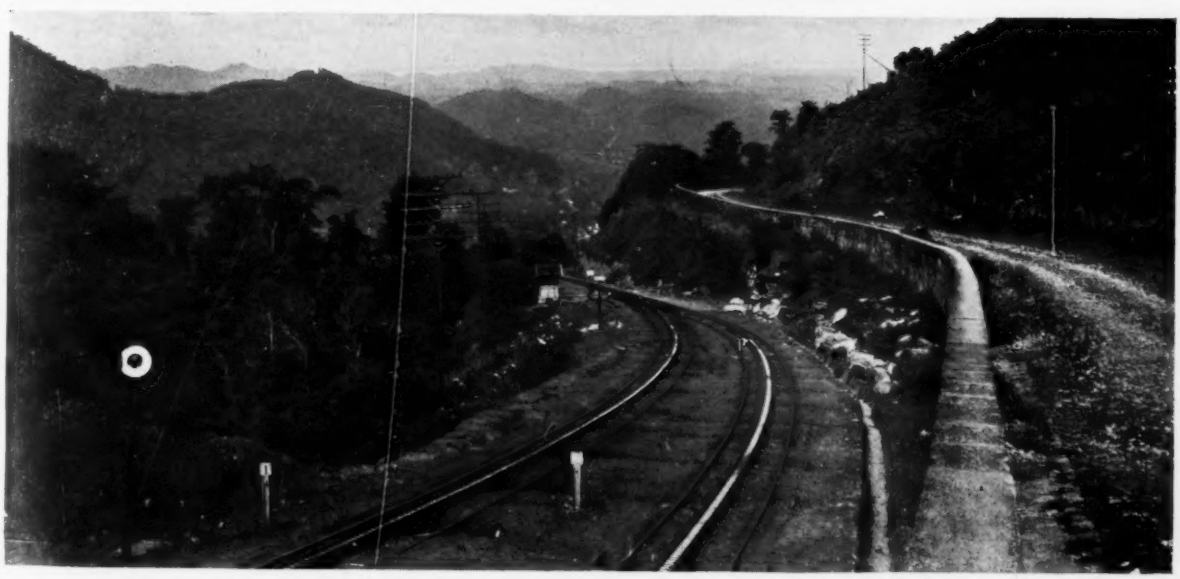
The reason why so many people continue to use the trains is not hard to seek. First of all the coaches are very comfortable, for, notwithstanding the narrowness of the gauge, they are 8 ft. 6 in. wide over all and seat 40 first class passengers in well-sprung Carlyte reversible chairs, placed in 10 rows of 2 on either side of a centre corridor. Moreover, the ordinary fares are exceedingly attractive, amounting, at the present rate of exchange, to 1s. 3d. single and 2s. 6d. for the return first class, while season-ticket rates (1 month and 12 months) are proportionately cheap. For distances of 36·25 miles (single) and 72·5 miles (return), these fares must, in view of the nature of the services provided, surely be unique in railway travel. Nor must it be forgotten that, to business men and tourists alike, the incline itself, in addition to its technical interest, is of great scenic attraction; for, apart from the grandeur of the immediate surroundings, the view on a clear day, from an ascending or descending train, of the flat country beneath, with Rio and its famous bay in the far distance, has few equals anywhere in the world.

British Railways at Paris International Exhibition.—Arrangements have recently been concluded whereby the British railways and the Travel Association of Great Britain and Ireland will be jointly represented at the international exhibition to be held in Paris from May to November. In collaboration with the authorities of the British Government pavilion, arrangements have been made for an illuminated Neon diagram of the British Isles, showing the main-line routes of each railway system, to be displayed prominently on the outside wall of the pavilion. Inside the pavilion, in the main elliptical hall, will be a joint railway stall, the personnel of which will be provided jointly by the British railways and the Travel Association.



Petropolis Incline, Leopoldina Railway (Brazil)

This series of views shows a group of incline engines at Alto da Serra, including No. 13, *built at the shops there, and a reinforced concrete bridge being tested. Opposite, an ascending passenger train is shown on Grota Funda viaduct, and below is a general view of the country traversed with the approach to Meio da Serra station in the foreground. Note the rack and special arrangement of the ballast boxing for efficient* (cross) *drainage*



THE MACHINING OF RAILWAY AXLES

The two new Craven lathes illustrated on the opposite page are specially adapted to this purpose

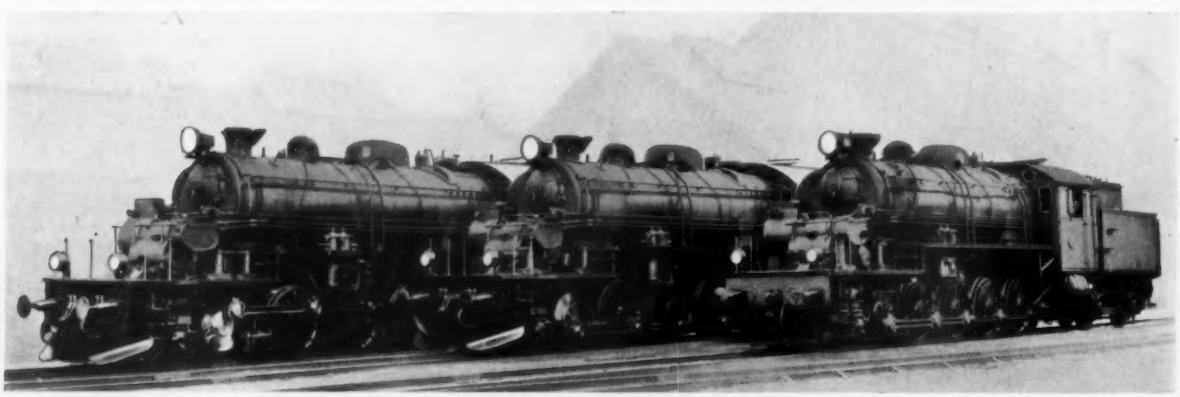
NEW machines recently built by Craven Brothers (Manchester) Limited for use in railway shops are an axle journal re-turning and wheel boss facing lathe suitable for wheels 4 ft. diameter on tread, and a 15½-in. centre double-ended high speed axle journal and wheel seat turning machine.

The first of these machines has been specially designed for re-turning simultaneously the two outside journals of carriage or wagon axles with wheels mounted at 5 ft. 6 in. gauge, and for facing back simultaneously the adjacent bosses of both wheels. The lathe admits wheels up to 4 ft. diameter on tread, on axles up to 8 ft. 6 in. in length between centres, and deals with journals up to 6¼ in. diameter by 12½ in. long. The machine, illustrated in Fig. 1, is of the centre driving headstock type, and consists of a bed with gap to receive the wheel sets, on each end of which is fitted a saddle having variable self-acting longitudinal feed traverse with turret turning rest at the front, and variable self-acting traverse for boss facing. Each end is also fitted with a loose headstock with adjustable spindle to carry the axle on live centres. The drive is by constant-speed motor and Tex-ropes through a four-speed variable gearbox with worm-wheel on spindle, the plate clutch being incorporated in the drive for effecting the changes of speed without stopping the motor, and without risk of undue wear to the gears or other parts.

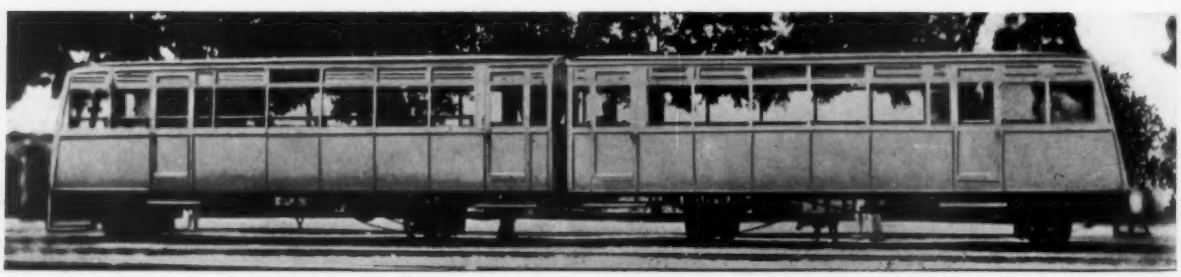
The wheel boss facing consists of the removal of ½ in. off the outside faces of the wheel bosses to convert the old standard wheel sets to the new standard, to accommodate the new pattern axlebox. The lathe is arranged so that the various operations can be carried out simultaneously with each end of the axle, *i.e.*, journel re-turning or wheel boss facing without removal of tools. This is a robust and well designed machine tool admirably suited in all respects for the work operations referred to.

The 15½-in. centre axle journal and wheel seat turning lathe (Fig. 2) is specially designed for rough and finish turning the wheel seats and journals, and turning both ends of carriage or wagon axles simultaneously. For the turning operations, the front rests are fitted with tool holders carrying Wimet tools for the wheel seat and journal turning, and high speed steel tools for the radii, and are also provided with taper turning motion for wheel seats. The machine is fitted with a centre driving headstock and two saddles, each with front and back rests, and is arranged for driving by constant-speed motor through a nine-speed variable gearbox with speed range to suit both high-speed steel and Wimet tools. Motor-operated quick power motion is provided to traverse both saddles along the wing, and the tool rests transversely in both directions. The lathe is of the maker's latest design, of the high speed type and of massive construction throughout for heavy duty.

Space will not allow of our presenting detailed specifications of these two new machines, but it is obvious from the particulars contained therein that they are very useful additions to the machine tool equipment of railway carriage and wagon shops.



Three non-condensing turbine locomotives in Swedish service (*see editorial note on page* 43)



Railcar set with Thornycroft petrol engines, Bhavnagar State Railway (*see news paragraph on page* 74)

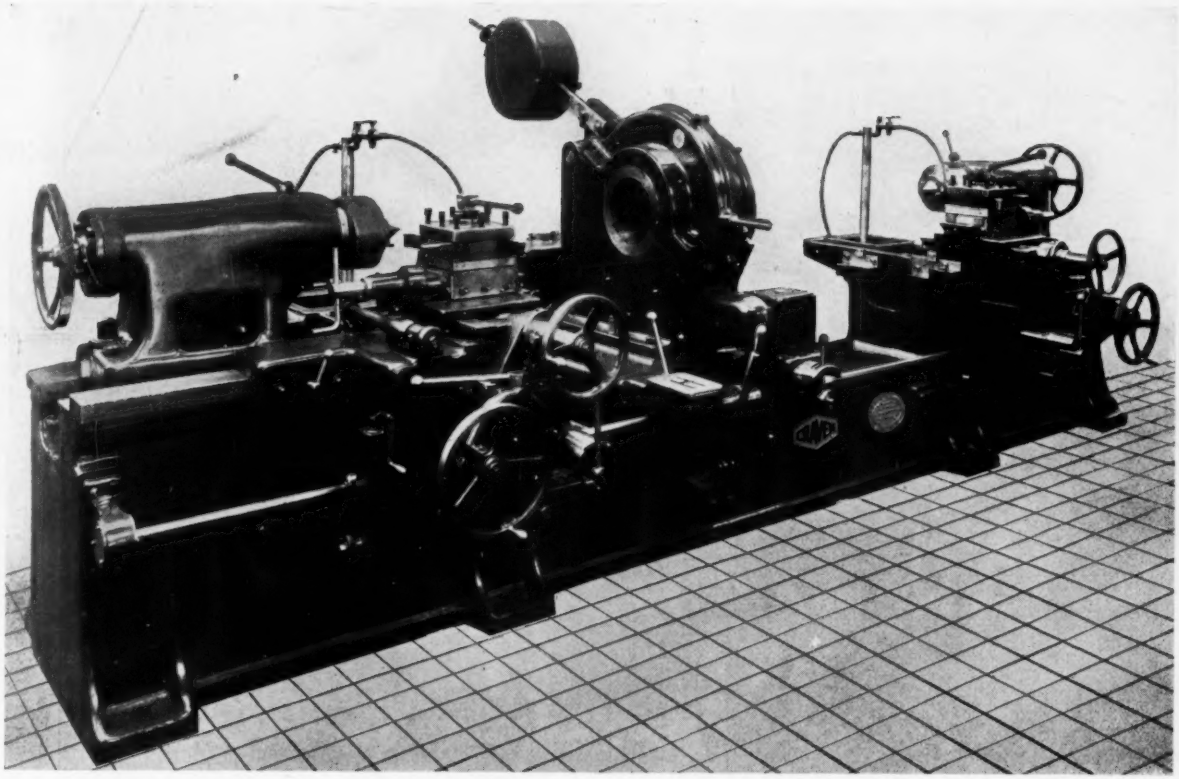


Fig. 1—Craven axle journal re-turning and wheel boss facing machine

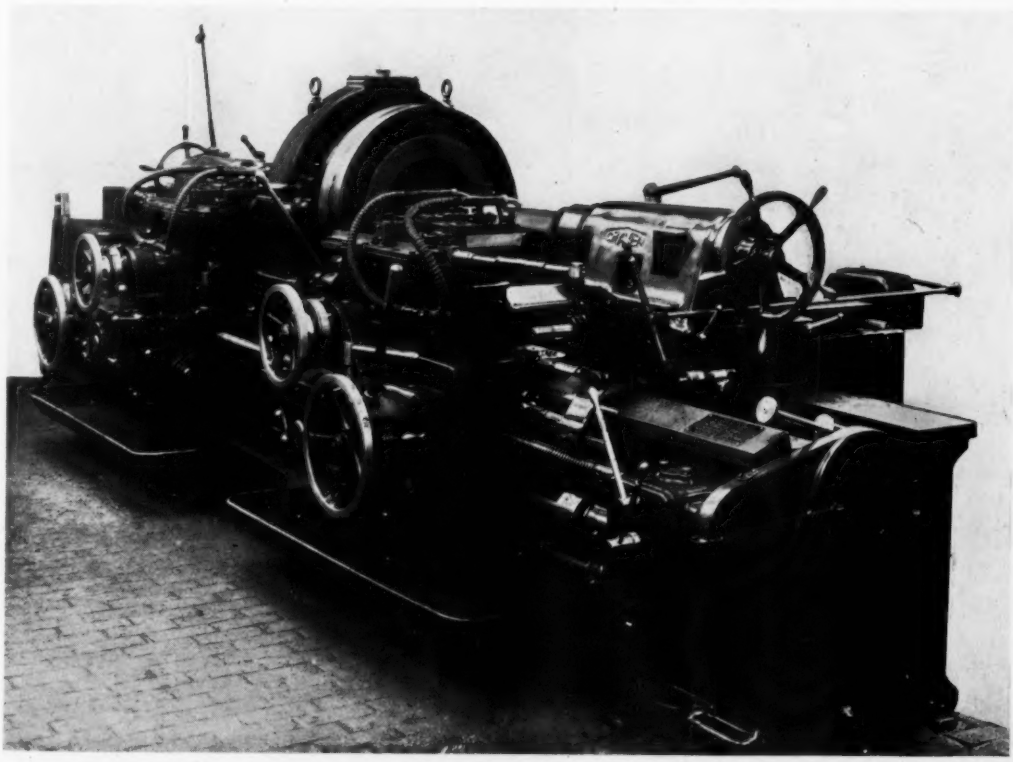
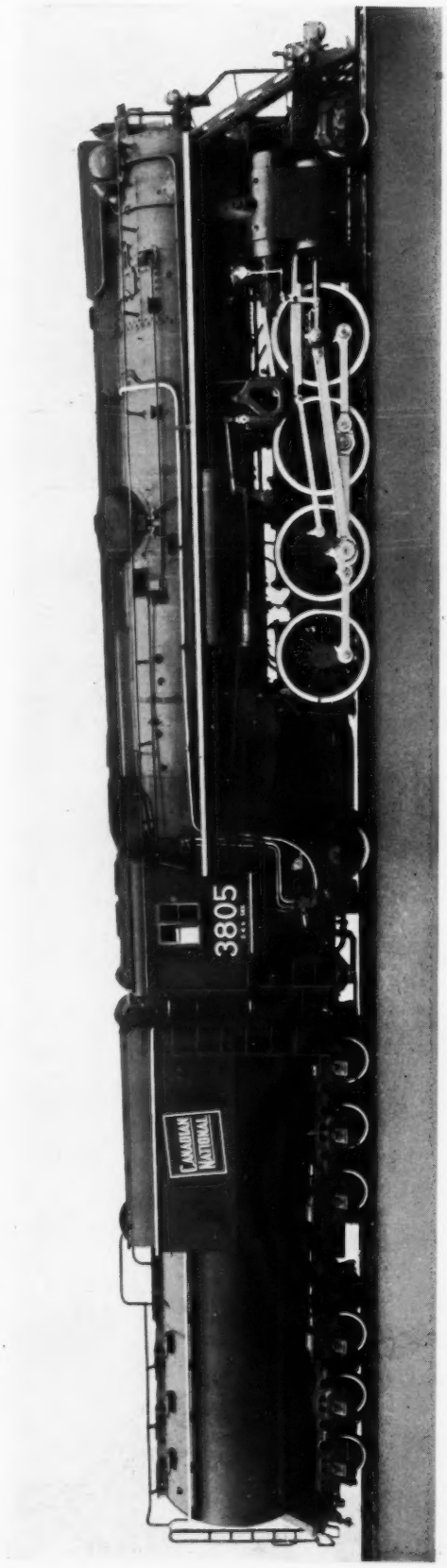


Fig. 2—Craven 15½ in. centre double-ended high-speed axle journal and wheel seat turning machine

(Above) exterior, and (below) interior of Bergen station, Norwegian State Railways. Bergen was connected with the main railway system as recently as November 27, 1909. *(See editorial notes on page 42)*

Exterior of Haparanda station, Swedish State Railways. The right-hand section of the building comprises the station hotel, a typical Swedish feature

International railway bridge over the Tornea river linking Haparanda (Sweden) and Tornea (Finland). This bridge, which was opened on October 6, 1919, is referred to in an editorial note on page 42



New 2-8-2 type heavy freight locomotive, Canadian National Railways

NEW 2-8-2 LOCOMOTIVES, CANADIAN NATIONAL RAILWAYS

These engines have been built for heavy freight service in Western Canada

THE locomotive we illustrate is one of a series of five recently built by the Canadian Locomotive Company at Kingston, Ontario, which, on completion, were sent to Western Canada to be placed in freight service. The outstanding feature of the design is the external steam pipe on the top of the boiler. This eliminates the dome and extends forward to a main regulator valve bolted to a horizontal flange on the superheater header. A pipe leads from the rear end of the steam pipe to supply saturated steam to the right hand turret in the cab, whilst an auxiliary steam pipe connects the superheater header with the left hand turret for supplying superheated steam to auxiliaries.

The cylinders, placed outside the frames, drive the third pair of coupled wheels, and steam distribution is effected by Baker gearing of the long lap type, the piston valves working above the cylinders. Floating bushings are applied to the connecting rod big ends, also in the main and intermediate side rod connections and in the axle-boxes of the coupled wheels. The engines are fitted with mechanical stokers and cabs of the short vestibule type built up of welded steel. The following are the main dimensions:—

Cylinders, dia.	24 in.
Piston stroke	30 in.
Coupled wheels, dia.	5 ft. 3 in.
Wheelbase, rigid	16 ft. 9 in.
Boiler, inside dia. at front	6 ft. 8⅞ in.
,, outside dia. rear end	7 ft. 6 in.
Working pressure	265 lb. per sq. in.
Heating surfaces:—	
Tubes	3,065 sq. ft.
Water tubes and syphons	91 ,,
Firebox	248 ,,
Total	3,404 ,,
Superheater	1,452 ,,
Combined total	4,856 ,,
Grate area	70·28 sq. ft.

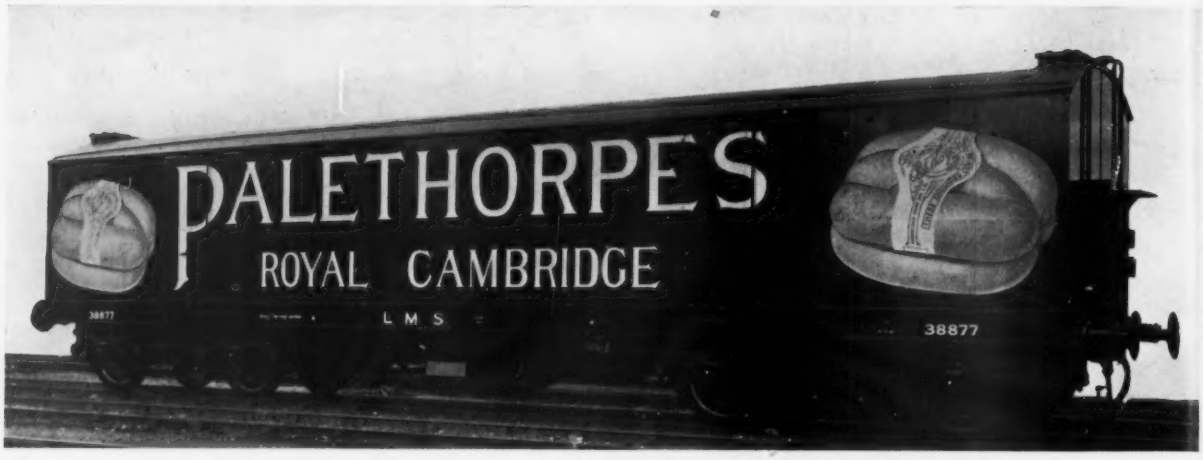
In working order the engine weighs 151 tons 10 cwt. The tender, which is carried upon two six-wheeled bogies, is of the Vanderbilt cylindrical type. It carries 11,600 imperial gallons of water and 20 tons of coal, and weighs in working order 124 tons 10 cwt., giving a total weight for engine and tender in working order of 276 tons. The engine develops a maximum tractive power of 56,200 lb., the factor of adhesion being 4·2.

FASTER EAST AND WEST COAST TRAINS TO SCOTLAND.—Mr. William Whitelaw, Chairman of the L.N.E.R. in a speech at the dinner of the Inland Colliery Owners at Grosvenor House on Monday, referred to the fact that the present year would show further proof of the development still open to the coal-fired locomotive. "During this year," he added, "we and the L.M.S.R. will give further proof of what this development means when one of us will run our trains from London to Edinburgh and the other from London to Glasgow in an hour and a quarter less than the fastest train has taken in recent years." It will be recalled that the 1¼-hr. acceleration to Edinburgh to be effected by the L.N.E.R. streamlined Coronation express was referred to in our issue of November 6, but that the L.M.S.R. has not yet followed its high-speed Euston-Glasgow experimental runs of November 16 and 17 by an announcement of its plans for this year.

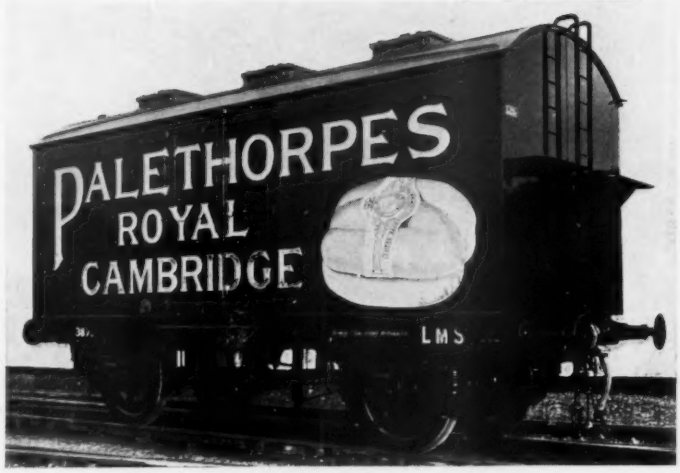
(Above) exterior, and (below) interior of Bergen Station, Norwegian State Railways. This bridge, which was opened on October 6, 1919, is referred to Bergen was connected with the main railway system as recently as November 27, in an editorial note on page 42
1909. (See editorial notes on page 42)
Tornea (Finland).

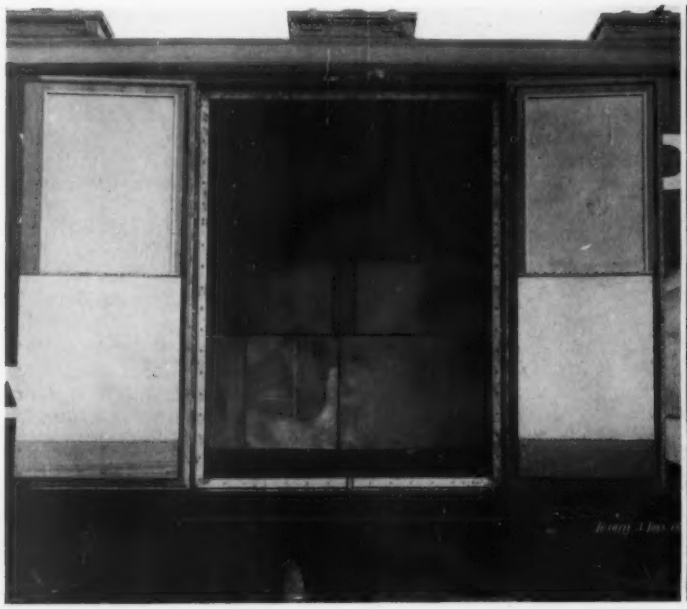
XUM

L.M.S.R. Insulated Vans for Sausage Traffic



The L.M.S.R. has built at Wolverton eight insulated vans for Palethorpe's sausage traffic, of the following capacities: two three-ton (four-wheeled, 21 ft. long) shown alongside; four six-ton (six-wheeled, 31 ft. long); and two seven-ton (two four-wheel bogies, 50 ft. long) illustrated above. In the two larger sizes special arrangements are made for interior illumination and air circulation, the Wolverton train lighting sets supplying both the lights and the motors of the axial flow streamlined fans (two in the 50-ft. and one in the 31-ft. vans), which deliver 600 cu. ft. of air per min. Air ducts in the ceilings are provided with shutter-controlled vents by means of which the air circulation can be adjusted. The van doors are arranged to stop the fans and switch on the lights when opened, and vice versa. Ice bunkers are provided in the four-wheel vans, in which a portable fan is used only for cooling prior to despatch. The vans, which incorporate the latest L.M.S.R. standard practice, were designed by Mr. W. A. Stanier, Chief Mechanical Engineer





RAILWAY NEWS SECTION

PERSONAL

H.M. the King has been graciously pleased to continue his patronage of the Railway Benevolent Institution. The institution has, therefore, been honoured by the patronage of the last five reigning monarchs.

In this connection and to obviate the necessity for publishing further similar announcements, the following memorandum issued by the Keeper of the Privy Purse may be noted:—

"The Keeper of the Privy Purse has been commanded by the King to state that His Majesty is pleased to intimate to those societies and institutions which were recently granted patronage by King Edward VIII, that they may continue to show the Sovereign as their patron during the present reign unless otherwise notified."

From *The London Gazette* of January 1:—

Regular Army; Supplementary Reserve of Officers; Royal Engineers—

Major R. W. F. Poole, M.C., to be Lieutenant Colonel (January 1).

Lt. S. K. Gilbert to be Captain (October 1, 1936).

Territorial Army; Royal Engineers; Engineer & Railway Staff Corps—

Col. Sir Henry Fowler, K.B.E, T.D., M.Inst.C.E., M.I.Mech.E., and

Major F. Bushrod, O.B.E., resign their commissions, with permission to wear the prescribed uniform (January 2).

Mr. Herbert Edward Ogle Wheeler to be Major (January 2).

Sir Henry Fowler was formerly Chief Mechanical Engineer, L.M.S.R.; and Major Bushrod has lately retired from the position of, and Major Wheeler is now, Superintendent of Operation, Southern Railway.

Mr. Roger W. Birdseye has been appointed General Advertising Manager of the Santa Fé Railway, U.S.A.

Mr. N. W. Storer, Consulting Railway Engineer, Westinghouse Electric & Manufacturing Company, has retired after 45 years' service. He was prominently associated with the electrifications of the New York, New Haven & Hartford; Chicago, Milwaukee, St. Paul & Pacific: Great Northern and Pennsylvania Railroads.

Mr. F. E. Harrison, O.B.E., M.Inst.C.E., who, as announced in our issue of December 11, has been appointed Engineer, North Eastern Area, L.N.E.R., is the eldest surviving son of the late Mr. C. A. Harrison, for many years Engineer of the Northern Division of the former North Eastern Railway, and later Consulting Engineer to that company. Born in 1882, Mr. F. E. Harrison was educated at Aysgarth School, Yorkshire, and Winchester College. After serving a pupilage with the former North Eastern Railway at Newcastle-on-Tyne, he was employed with Sir John Jackson Limited on the extension of the Naval Dockyard at Devonport. In 1906 he again entered the service of the North Eastern Railway at Newcastle-on-Tyne, and three years later was appointed District Engineer of the Northumberland Area, becoming District Engineer, Newcastle-on-Tyne, in 1913. During the war Mr. Harrison served in France on the staff of the Director-General of Transportation, with the rank of Major, R.E. On returning to the railway service, he assumed his former position, and in 1930, when the Northumberland and Newcastle-on-Tyne Districts were amalgamated, Mr. Harrison was placed in charge of the combined area. His appointment as Assistant Engineer, North Eastern Area, dates from 1934, and it is from this position that he is now promoted to be Engineer, North Eastern Area, on the retirement of Mr. J. Miller, B.E., LL.D., in February.

Mr. F. E. Harrison,

Appointed Engineer, North Eastern Area, L.N.E.R., as from February 27 next

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INDIAN RAILWAY STAFF CHANGES

Mr. C. F. Gilbert has been confirmed as Deputy Agent, E.I.R.

Mr. H. P. Renwick has been confirmed provisionally as Deputy Transportation Superintendent, G.I.P.R., as from October 16, 1936.

Mr. K. Peddie has been appointed to officiate as Deputy Chief Engineer, E.I.R., as from October 31, 1936.

Mr. R. L. W. Meehan has been appointed to officiate as Chief Mechanical Engineer, E.B.R., as from November 6, 1936.

Mr. L. N. Flatt, V.D., has been appointed to officiate as Chief Mechanical Engineer, N.W.R., as from November 9, 1936.

Mr. J. C. O'Neill has been appointed to officiate as Divisional Superintendent, N.W.R., as from October 22, 1936.

Mr. E. C. Whelan has been appointed to officiate as Deputy Chief Engineer (E.), N.W.R.

Mr. S. M. Johnson, Officiating Deputy Chief Engineer, Bridges, N.W.R., has been granted 8½ months' leave as from November 12.

Mr. F. J. Salberg, M.B.E., V.D., Chief Engineer, A.-B.R., returned from leave on November 24 and assumed charge from Mr. L. F. W. Nolan who reverted as Deputy Chief Engineer.

Mr. G. D. Laurie, Chief Auditor, B. & N.W., & R. & K. Railways, returned from leave and resumed duty on November 25, 1936.

Mr. A. Duncan, on return from leave, has assumed charge as Transportation Manager, B.-N.R., as from December 9, 1936. Mr. P. R. Leigh-Bennett, acting Transportation Manager, reverted to his substantive appointment as Superintendent Transportation Power, as from the same date.

Mr. G. Thompson has been confirmed as officiating Locomotive & Carriage Superintendent, Burma Rail-

ways as from November 28, 1936, in place of Mr. R. H. Mackie, retired from Government service on that date.

Mr. W. O. Chalk, Superintendent of Mechanical Workshops, N.W.R., has been permitted to retire from Government service as from November 28, 1936.

Mr. L. W. Van Someren has been appointed to officiate as Traffic Manager, and Mr. H. W. Meakins as Deputy Traffic Manager (Commercial), E.B.R., as from December 1.

Sir James Williamson, until recently Agent of the Bengal & North Western and Rohilkund & Kumaon Railways, has been appointed a Director of the former company.

Lt.-Col. W. R. Izat (R.E. ret.) has been appointed a Director of the latter company. These appointments have been made to fill the vacanies caused by the recent death of Sir Henry Burt.

Dinner to Viceroy and Sir Ralph Wedgwood

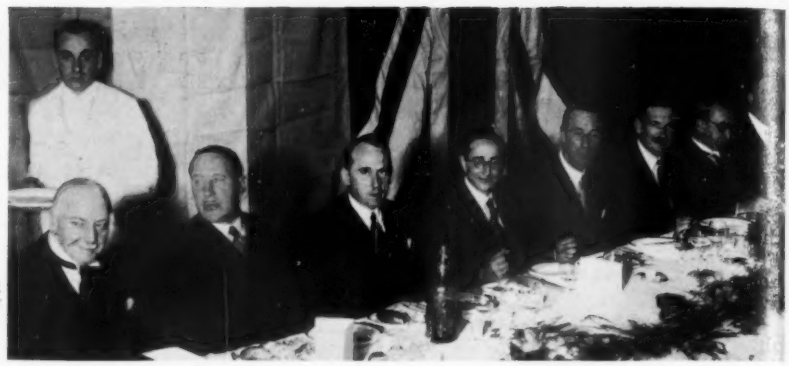
On November 21, a dinner was given in Delhi by the Indian Railway Board, at which the Viceroy and Sir Ralph Wedgwood were the guests of honour. The hosts were the Hon. Sir Guthrie Russell, Chief Commissioner of Railways, Mr. P. R. Rau, Financial Commissioner of Railways, and Messrs. A. E. Tylden Pattenson and J. C. Highet, Members of the Board. The following is a list of the guests :—

H.E. the Viceroy, Sir Ralph Wedgwood and Mr. W. A. Stanier (Members of the Indian Railways Inquiry Committee), Sir Ernest Burdon, Sir Frank Noyce, Sir James Grigg, Sir Jagdish Prasad, Sir Maurice Brayshay (Agent, B.B. & C.I.R.), Sir James Pitkeathly, Mr. H. N. Colam (Agent, M. & S.M.R., and President, Indian Railway Conference Association), Mr. C. A. Muirhead (Agent, S.I.R.), Mr. G. E. Cuff (Agent, A.-B.R.), Lt.-Col. C. F. Carson, R.E. (Agent, N.W.R.), Mr. L. Wilson (Agent, G.I.P.R.), Mr. J. D. Westwood (Agent, B. & N.W. and R. & K.R.), Major E. W. Slaughter (Agent, H.E.H. the Nizam's State Railway), Mr. B. Moody (Secretary to the Railway Board), Col. H. L. Woodhouse (Director of Civil Engineering, Railway Board), Mr. J. M. D. Wrench (Chief Controller, Standardisation, R.B.), Mr. T. S. Sankara Aiyar (Director of Finance, R.B.), Mr. E. Ingoldby (Director of Mechanical Engineering, R.B.), Mr. F. D'Souza (Director, Traffic, R.B.), Mr. L. H. Kirkness and B. M. Strouts (Joint Secretaries, Inquiry Committee), Mr. A. Forbes Smith (Rates Expert with the Committee), Mr. B. Lawrence (Secretary, I.R.C.A.), Lt.-Col. H. H. Stable, the A.D.C. to the Viceroy and Messrs. H. Dow, R. F. Mudie, J. C. Nixon, and J. G. Laithwaite.

A group photograph taken at the dinner is reproduced below.

The retirement is announced, as from October 31, of Dr. Ott, General Manager of the Lübeck-Büchen Railway, the largest private line in Germany. After a legal training, Dr. Ott joined the old Palatinate Railway Company and was later transferred to the Bavarian State Railway, when it absorbed that company's system. In March, 1910, he joined the Lübeck-Büchen Railway and became General Manager in 1925. He has been active in the German Private Railways Union and the Central European Railway Association, being much interested in staff welfare and safety-first movements.

We regret to announce the death of Mr. D. F. Woods, Chief Accounts Officer, North Western Railway of India, which occurred in Lahore on November 30. Born in 1882, Mr. Woods joined the Indian Railway Acccunts Department in 1912 and was promoted to be Deputy Chief Accounts Officer, Great Indian Peninsula Railway and then North Western Railway in 1929. In May, 1931, he was appointed to officiate as Chief Accounts Officer of the Eastern Bengal Railway



Left to right: Messrs. R. E. Kimberley (Chief Mechanical Engineer, Buenos Ayres & Pacific Railway), D. M. MacRae (General Manager, Central Argentine Railway), M. F. Ryan (General Manager, B.A. & P.R.), Engineer Manuel Garcia Torre (Director-General of Argentine Railways), Messrs. O. Steven (Chief of Operation, Buenos Ayres Great Southern & Buenos Ayres Western Railways), J. Hurleston Leche (Counsellor to the British Embassy), C. Le Maistre (Director, British Standards Institution), and H. G. Beckwith (Locomotive Works Manager, B.A. & P.R.).

Group taken at the annual dinner of the South American Centre of the Institution of Locomotive Engineers in Buenos Aires on November 6, 1936, described in our Overseas columns on page 50

Left to right: Sir Frank Noyce ; Mr. P. R. Rau (Financial Commissioner, Railway Board) ; H.E. the Viceroy, Lord Linlithgow ; Sir Guthrie Russell (Chief Commissioner for Railways) ; Sir Ralph Wedgwood (Chief General Manager, L.N.E.R., and Chairman of the Indian Railways Inquiry Committee) ; Sir James Grigg ; Mr. A. E. Tylden Pattenson (Member, Railway Board) ; Sir Jagdish Prasad and Mr. H. N. Colam (Agent, M. & S.M.R.).

Group showing some of those present at a dinner given by the Chief Commissioner and Members of the Railway Board at Maiden's Hotel, Delhi, on November 21, at which H.E. the Viceroy and Sir Ralph Wedgwood were the principal guests

and was confirmed in that post in August, 1932. It was in September, 1933, that he was transferred to the N.W.R. in a similar capacity.

The Crown Agents for the Colonies have appointed Mr. J. L. Bomford to be Accountant, Nigerian Government Railway and Colliery.

It is with regret that we note the death, which occurred on January 3, of Mr. A. E. Laslett, I.S.O., sometime Engineer Surveyor-in-Chief to the Board of Trade.

Sir Alexander Gibb is understood to be visiting Angora in connection with the appointment of a foreign consultant engineer to the Turkish Ministry of Public Works, according to *The Times*.

Mr. A. Ross Owen, Canadian Pacific Railway's representative in Italy, retired on December 31, 1936, after 48 years' service with the company during the last 10 of which he has held the post from which he retired. Mr. J. A. Philip has been appointed to succeed him, as from January 1.

We are sorry to learn that Sir John Aspinall, sometime Chief Mechanical Engineer and then General Manager of the former Lancashire & Yorkshire Railway, who recently had a heart attack, is seriously ill at his home near Woking. He is in his 86th year.

We regret to note the death, on January 3, of Mr. William Henry Owen, M.Inst.C.E., a pioneer of high-speed steam engine and turbine design; also of forced-feed lubrication and the "limit-gauge" system in construction methods. For many years he was connected with Willans & Robinson, Bellis & Morcom, James Howden Robey and other well-known firms and latterly devoted his attention to water tube boiler, pre-heater, and fuel economy experiments and inventions.

We regret to learn of the death on November 15, at the age of 73, of Mr. Charles C. Anthony, a well-known American signal engineer. After leaving Cornell University, where his father was a professor, Mr. Anthony took up telephone work and then served with the Johnson Railroad Signal and the Union Switch & Signal Companies, assisting in the installation of the lock-and-block on the New York Central main line in 1892. He was appointed to that railway in 1893, and in 1895 joined the Pennsylvania system; he was made foreman at Altoona in 1900 and Signal Supervisor in 1902. Mr. Anthony became an Inspector in the Signal Engineer's office at Philadelphia in 1904 and was made Assistant Signal Engineer in 1907, resigning in 1917 to take up consulting work. A member of the leading engineering institutions, he was elected President of the Railway Signal Association for 1912, and dealt with "Signalling as a Profession" in his presidential address. He was closely associated with the development of speed signalling principles and aspects, and contributed many articles to the technical press on that question.

We regret to record the recent death of Mr. E. H. Ballard, who was Chief Engineer Way and Works, Victorian Government Railways, from 1918 to 1928. Mr. Ballard left England for Australasia in 1881, and after constructional experience in Australia and Fiji entered the Engineer's Department of the Victorian Government Railways in 1886.

Staff and Labour

Railway Shopmen

Industrial Court Decision No. 1,671, dated December 23, deals with a difference which arose between the National Union of Railwaymen and the Southern Railway in respect of a claim of men employed in the asphalting gang in the Civil Engineer's Department at Brighton that they are entitled to extra payment. The men concerned in the claim were three asphalters and two labourers, and it was contended by the union that the work performed by them was of an exceptionally dirty character and that in the performance of their duties their clothes were damaged. On behalf of the company it was submitted that the men concerned constitute a gang whose work in the main necessitated the using of tar, and that the use of tar was incidental to the ordinary and customary duties of their class. The Court upheld the view of the company in so far as the three asphalters were concerned, and, as regards the labourers suggested that the matter be further considered by the parties in the light of the Court's Decision No. 1,191.

FRENCH RAILWAY POSTERS.—"An honest tale speeds best, being plainly told," and so we particularly appreciate a poster from the Alsace-Lorraine Railways advertising winter sports in Le Hohwald. The cheerful design by Roger Broders at once conveys the happy fact that here those whom necessity obliges to be economical can enjoy themselves on skis or otherwise in any clothes that are good enough to fall down in. More affluent and accomplished exponents of these arts can repair to some of the other resorts represented in a handsome batch of posters from the P.L.M. and P.O.-Midi, where rather more attention to equipment is desirable. One would hesitate to join the skiers ascending to Rochebrune in the cable railway shown in a fine P.L.M. poster by R. Michaud, wearing the old pair of trousers one uses for going underneath the car. Nor would one in such a guise be welcomed among the helmeted heroes whose skis trace eye-catching patterns on the snows of Superbagnères, in a colourful P.O.-Midi poster.

Forthcoming Events

Jan. 8 (*Fri.*).—Civil Engineering Society, at Royal Technical College, George Street, Glasgow, 7.45 p.m. "Scottish Railway Development, with Particular Reference to Engineering Works," by Mr. J. Gardner.

Omnibus Society, at Inst. of Marine Engineers, The Minories, London, E.C.3, 7 p.m. "One Hundred Years of Railway Owned Omnibuses," by Mr. Charles E. Lee.

Railway Students' Association (Edinburgh), at Goold Hall, St. Andrew Square, 7.30 p.m. Debate: "That British Railway Commercial Practice Adequately Meets Present Day Requirements." Affirmative: Glasgow Railway Lecture and Debating Society. Negative: Railway Students' Association.

Jan. 11 (*Mon.*).—Institute of Transport (London), at Inst. of Electrical Engineers Savoy Place, W.C.2, 5.30 p.m. "Some Considerations of Problems affecting Port Management," by Sir Lionel A. P. Warner, C.B.E.

Institute of Welding (Tyneside), at Armstrong College, Newcastle, 7.30 p.m. "Distortion, Residual Stress and Heat Penetration in Respect to Welded Joints," by Mr. H. Martin.

Permanent Way Institution (London), at Underground Electric Railway Dining Club, Pelham Street, S.W.7, 7 p.m. "Notes on Modern Railway Construction," by Mr. A. Butland.

Jan. 12 (*Tues.*).—Institute of Transport (Birmingham), at Queen's Hotel, 6 p.m. "Road Transport of Goods—a National Necessity," by Mr. L. Gupwell.

Institute of Transport (Nottingham Graduate), at Guildhall, 7 p.m. "Accelerated Transits of Merchandise by Rail," by Mr. P. West.

Institution of Civil Engineers, Great George Street, London, S.W.1, 6 p.m. "Pre-Stressing Bridge Girders," by Mr. H. Nichols. "The Silver Jubilee Bridge at Broach," by Mr. H. Nichols.

Permanent Way Institution (Scottish), at Royal Technical College, George Street, Glasgow, 7.15 p.m. "Continental Railways," by Mr. W. A. Willox.

Jan. 13 (*Wed.*).—Diesel Engine Users' Association, at Caxton Hall, Caxton Street, London, S.W.1, 4.45 p.m. Working Costs Report.

Institute of Transport (Manchester-Liverpool Graduate), at Exchange Station Hotel, Liverpool, 6.30 p.m. "Control and Regulation of Trains," by Mr. W. Hadley.

Institute of Welding (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6.30 p.m. "Welding Non-Ferrous Metals—Some Problems," by Mr. H. Hignett.

Institute of Welding (Scottish), at Royal Philosophical Inst., 207, Bath Street, Glasgow, 7.30 p.m. "Modern Developments in Welding," by Mr. E. Waddington.

Permanent Way Institution (Newcastle), at Mining Inst., Westgate Road, 7 p.m. "The Working of a Large Goods Station," by Mr. C. Corps.

Jan. 14 (*Thurs.*).—Glasgow University Engineering Society, 7.30 p.m. "Line and Level in the Setting-out of a Tunnel," by Mr. J. Robertson.

Institute of Metals (London), at Society of Motor Manufacturers, 83, Pall Mall, S.W.1, 7.30 p.m. "Copper," by Mr. R. Burn.

Institute of Welding (Liverpool), at City Technical College, Byrom Street, 7.30 p.m. "The Welding of Lead and Low Melting Point Alloys by the Oxy-Acetylene and other Flame Processes," by Mr. E. Partington.

Institution of Structural Engineers (London), at Inst. of Civil Engineers, Great George Street, S.W.1, 6.30 p.m. "Steelwork in Buildings: Thirty Years' Progress," by Mr. S. Bylander.

Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4, 7.30 p.m. "The Tonbridge Alterations," by Mr. L. Catchpole.

Southern Railway (London) Lecture and Debating Society, at Chapter House, St. Thomas's Street, S.E.1, 5.45 p.m. "The Effect of Inventions on Railway Development," by Mr. W. A. Willox.

Jan. 15 (*Fri.*).—Institute of Transport (Leeds), at Town Hall, 6.30 p.m. Paper by Mr. W. Morland.

Locomotive Men's Claim for a Six-Hour Day

Decision of the Railway Staff National Tribunal against the claim

The Railway Staff National Tribunal has now issued its decision on the claim brought before it by the Associated Society of Locomotive Engineers and Firemen in respect of engine drivers, firemen, and engine cleaners.

The tribunal has found against the claim. The decision is a unanimous one, signed by the Chairman, Sir Arthur Salter, and by the two independent members, Mr. A. L. Ayre and Mr. H. J. May. The decision is accompanied by a full report, which is also unanimous. It will be necessary for the decision to be considered by the railway companies and by the Associated Society of Locomotive Engineers and Firemen. Delegates of the society will assemble in London on January 21.

The tribunal's report, together with its findings, is summarised below:—

The present claim, the second dealt with by the tribunal, is presented by the Associated Society of Locomotive Engineers and Firemen on behalf of the grades represented in its membership. We have carefully considered the claim on the basis of the information and arguments submitted to us in oral statements at the public hearings and in the documents presented to us and interchanged between the parties.

The grades included in the claim are the following: Drivers, 32,028; motormen, 1,054; firemen, 31,519; and engine cleaners, 6,708—total, 71,309. Of these about 50,000 are members of the Associated Society, and most of the others are members of the National Union of Railwaymen.

The main items of the claim, with the estimated annual cost, are:—

	£
i. Discontinuance of percentage deduction	208,000
ii. 6-hour day and 36-hour week ...	6,097,000
iii. Increased rates for Sunday, etc., duty, overtime and night duty	3,013,000
iv. 6 days extra holiday with pay...	386,000
	£9,704,000

Each of these estimates has been made on the assumption that all the demands were granted and the concessions only given to the grades included in the claim without involving similar concessions to other grades.

On the other hand, the estimates do not include any allowance for an extension of the concessions made to other grades than those now before us. As compared with the 71,309 staff in the grades before us the other grades (salaried and conciliation) covered by the machinery of negotiation agreement number some 330,000; and there are in addition other classes of railway employees, falling outside the agreement, whose wages and conditions of service are indirectly affected by any decisions given by the tribunal. To take the most important example, it was represented to us that the annual cost of substituting a six-hour day for all classes would amount to about £30,000,000.

If the concessions now asked were all granted, and similar concessions made to all classes of railway employees, the annual extra cost could not well be less than about £50,000,000. All the earnings of the railways could not suffice for such a sum, in addition to present wages, even if all classes of investors, including debenture holders, were deprived of the whole of their interest and dividends.

This claim has been presented by one union, concerned only with grades which altogether cover not more than about one-fifth of those included under the machinery of negotiation and sharing the membership even of these grades with another union which is not a party to the claim. The claim itself coincides in certain respects with the one on which the tribunal took a decision, which was to be operative for a year, only five months ago, and in other respects goes far beyond anything that could possibly be accorded by an award consistent with the standard set by that decision. Moreover, the claim is of such a character that it could not be entertained without necessarily affecting all the grades covered by the machinery of negotiation, all of which, including the grades represented by the Associated Society, were dealt with by the decision of July and the great majority of which are not now before us.

In these circumstances the problem presented to the tribunal can only be understood if the circumstances leading to, and resulting from, Decision No. 1 of July 27 last are borne in mind. At that time the two other railway unions, the National Union of Railwaymen and the Railway Clerks' Association, appeared together before the tribunal. They joined in asking that the remainder of the percentage deductions on earnings (originally prescribed by the National Wages Board Award No. 119 in March, 1931, and subsequently reduced by agreement) should be terminated; and the former union further asked that the standard rates for Sunday duty, night duty and overtime, which had been fixed by the National Agreements of 1919 and reduced by Award No. 119, should be restored. The sole reason why the Railway Clerks' Association was not associated with this latter claim was that its members were not affected by Award No. 119 as regards pay for special work and in this respect therefore had nothing to ask. The claims in July affected all grades within the scope of the machinery of negotiation; that is, equally the members of the Associated Society which is now before us. This society was not, however, an actual party to the claim in July, through a technical difficulty that appeared in the course of the prior negotiations. Their members did not, however, suffer any loss as a consequence of not being represented.

The tribunal in July (Decision No. 1) halved the percentage deduction in operation and restored the standard overtime rate of time-and-a-quarter, while leaving other conditions unchanged, and made the decision operative for a year from August, 1936; and these concessions benefited equally all men of the grades affected without regard to their union membership, *e.g.*, drivers, firemen and cleaners who were members of the Associated Society as well as those who were members of the National Union of Railwaymen. At the time when the tribunal met in July, the percentage deductions on earnings made by the National Wages Board in 1931 had already been reduced by an agreement of 1934. The deduction remaining in operation and the changes in the rates for Sunday duty, night duty and overtime, which the unions asked to be terminated, were equivalent in monetary effect to about £3 millions a year. The concessions in fact made by the tribunal, and already described above, amounted to just over £1 million, *i.e.*, rather more than one-third of what was asked for.

In announcing the decision the tribunal stated that the actual earnings results before it still showed a decline upon those before the National Wages Board in 1931. It felt justified, however, in making the concessions mentioned in view of the following considerations:—

(*a*) The general movement of railway earnings was upward. The *prospective* position for the year ahead was better than that of the moment. Gross receipts in the first 6 months of the year had been £2 millions above those for the corresponding period of the previous year (though the net increase was estimated at only £475,000) and were still increasing. And the tribunal anticipated that the upward movement would continue.

(*b*) In addition the tribunal felt justified (although the question was not then settled) in anticipating rating relief at the annual rate of £2 millions a year.

(*c*) The tribunal also held that, in dealing with deductions intended to be temporary, the case for returning to the standard rates became, other things equal, stronger with the lapse of time.

(*d*) Furthermore, the tribunal took account of the effect of staff economies in inflicting losses on the personnel in addition to the deductions on earnings, etc.

As compared with the prospects before the tribunal in July, we now have the actual results and events of another 5 months. These show the improvement which was then anticipated and taken into account in the decision. In the following respects, however, the improvement has been somewhat greater than was then expected.

(*a*) The annual rating relief will be £2,275,000 *i.e.*, £275,000 more than was estimated in July.

(*b*) The recovery of the excess payments made since 1931 (which was, according to the tribunal, to be properly considered as an off-set against previous withdrawals from reserves) may now be regarded as assured instead of uncertain.

(*c*) The gross receipts of 1936 will now, it is clear, exceed those of 1935 by about £5 millions;

that is the excess over 1935 in the last 6 months will be about £1 million more than in the first 6 months known to the tribunal in July. Gross receipts, however, are a misleading indication of probable net revenue; and as precise information as to expenditure (which has certainly been increasing) is not yet available, it would be unwise to assess the improvement, above what was anticipated in July, at a high figure.

Results since July certainly confirm the view then taken by the tribunal that the movement was upward and was likely to continue through the year in relation to which they were making their award. More than that, they show that the results so far somewhat exceed anticipations. At the same time any conclusions formed before the completed accounts are available for the year 1936 must necessarily be only tentative and provisional. We are clearly of the opinion in any event that nothing which has happened since July is such as to justify the tribunal in taking the extreme measure of cancelling the decision then given. The following are the tribunal's comments upon the present claim:—

(i) PERCENTAGE DEDUCTION

The claim, while now made by one union, is so framed as to recognise that if admitted it would necessarily apply to other grades besides those which are now before us. To grant the claim would therefore involve taking a decision with regard to staff of whom four-fifths are not before us, and cancelling Decision No. 1—action which we have already indicated that we do not consider to be justified by anything that has happened since July.

(ii) HOURS OF WORK

(a) A six-hour day and a thirty-six-hour week

This demand is put forward as applicable to the grades represented in the Associated Society. Even so limited, it would involve an annual cost of about £6 millions; and it is evident that, on the standard set by Decision No. 1, no claim involving any such amount could be granted in the present financial position of the industry. Moreover, it is obvious that such a change, if made, could not be confined to the grades on behalf of which the application is now presented. If applied generally the annual cost, as we have already pointed out, would amount to about £30 millions a year, which is clearly prohibitive.

(b) Exemption from "spread-over" turns for drivers, motormen, firemen, assistant motormen and engine cleaners

With the rejection of a six-hour day this demand has only a limited scope. All the grades in question except the engine cleaners are already exempt. The "spread-over" arrangement has been recognised by previous agreements and decisions as useful and suitable for the grades to which it is now applied; and we consider that there is no case for excluding engine cleaners who, as a grade engaged in stationary work and not in travelling, are similar to other grades subject to "spread-over." So far, therefore, as the demand would require an extension of the exemption to grades to which it does not now apply we are unable to agree to it.

(c) Split turns on Sunday

We are satisfied that this arrangement is a necessary and fair one on the assumption that the rostering of the men takes due account of any circumstances likely to affect the running of the train.

(d) Nine-hour Rostering

It was argued on behalf of the society that in some cases the arrangements are so interpreted as to involve unnecessary hardship. Such cases are, however, in any event exceptional and do not in our opinion justify any change in the agreements or decisions themselves, which are necessary to the efficient working of such an industry as the railways and, when reasonably worked with due regard to the necessity of avoiding preventable overtime, should not give rise to legitimate complaint.

(iii) EXTRA RATES IN RESPECT OF SUNDAY, &C., DUTY, NIGHT DUTY, AND OVERTIME

The claim would involve the changes shown in the following table:—

	Claim	Standard rates as fixed in 1919	Rates now operative
Sunday, etc., Duty	Double time	1½ time (double time for permanent way staff on certain special work)	1½ time (1⅝ in cases where double time previously given)
Night duty	1½ time	1¼ time ...	1¼ time
Overtime	1½ time (double time at night)	1¼ time (1½ at night)	1¼ time (1⅜ at night)

Decision No. 1 restored the standard rate of time-and-a-quarter for ordinary overtime, with a similar increase in the rate for night overtime, while leaving the other extra rates for the present as reduced by National Wages Board Decision No. 119. The differences in skill and character of work of different grades are represented in differences of basic wages, which are of course reflected in the fractional additions given for special duty and we see no reason for any change in the fractional additions for particular grades. The demand must therefore be regarded as one involving all grades and therefore a change in Decision No. 1. We have already explained why we cannot make a change in that decision which would be operative in the year for which it was prescribed.

This applies even to the demand for a cessation of the reductions of standard rates for special duty which are now operative, and must apply with even greater force to one for increases above the standard rates themselves.

(iv) TWELVE WEEKDAYS HOLIDAY (INSTEAD OF SIX) WITH FULL PAY.

We have given close consideration to this demand in the light of the arguments presented to us as to the extra work and strain involved for the grades now before us by present conditions of railway work, including that resulting from the considerable extension of Sunday excursions. We recognise that for the men most affected by this new Sunday work the opportunities of leisure are certainly reduced in the summer. The annual cost would be about £270,000 for the grades now before us, or £135,000 if three instead of six extra days were given. The cost, therefore, might not in itself be an insuperable difficulty, if a special case for new and extra strain for certain grades could be substantiated. Drivers and firemen may have in some respects a greater strain than some other grades, and perhaps in some respects a greater strain than that normally involved by work under the conditions in force in 1919 (when the standard holiday allowance was fixed) before the development of Sunday excursions on the present scale.

This is, however, not true of all men in the grades of driver and fireman; and may well be equally true of other grades which it is not within our competence now to examine under the terms of reference in this case and with only one union before us.

The grant of extra holidays would of course be a concession going beyond the standard agreed in 1919. In general we think that, as the financial situation permits concessions, a restoration of standard rates and conditions should take precedence over demands going beyond them. The question can only be properly considered if other grades besides those now before us are also taken into account.

For the reasons thus indicated, we find against the claim.

In doing so, we desire to point out that consideration of the financial situation, with a view to new negotiations, can begin as soon as the completed accounts for 1936 are available; that the improvement which the tribunal anticipated in July has not only been confirmed but has proceeded rather further than was then anticipated; that though it is impossible to forecast future results with certainty or to prejudge a future decision, the prospects of an application in regard to a further restoration of standard rates, if made at the appropriate time, would therefore at present appear favourable.

If an application is such as to need consideration in connection with all or most grades of railway employees, or involves such large expenditure as to react adversely upon other claims, it can only receive adequate consideration by the tribunal if it is presented by unions which together represent the great bulk of the railway staff and at a time which does not cause it to conflict with other decisions which are operative for a prescribed period. There is, however, no reason why a claim should not be so put forward by one union if it can be decided without

repercussions upon grades not in the union.

Decision No. 1 and the reports accompanying both that and the present decision indicate the standard and the principles which the tribunal must observe in deciding upon any case which comes before it. Arguments by the companies have sometimes been based upon the amount of the standard revenue laid down by the Railways Act, 1921. It will be evident from both reports of the tribunal that it does not take this as a criterion by which to consider whether it can endorse a claim or not. The tribunal considers that, if the present improvement continues, railway employees should obtain a share in the improvement without waiting for the large increase in railway profits that would be required before the revenue contemplated in 1921 can be reached. This attitude is clearly implied in Decision No. 1—as indeed it was already in the voluntary agreement of 1934.

On the other hand it is equally clear that, even apart from the difficulties resulting from the conditions under which it was presented, no claim involving such a large expenditure as that which would result from the substitution of a six- for an eight-hour day could, in the present financial situation of the railways or any improved position which can be regarded as possible within the near future, be consistent with the standard and principles stated in the decisions and reports.

The decision of the tribunal (No. 2, dated December 29, 1936) is published (Price 3s.) by the Special Joint Committee on Machinery of Negotiation for Railway Staff, 35, Parliament Street, Westminster, S.W.1.

Road Transport Wages

Shortly before Christmas the committee appointed by the Ministers of Labour and Transport met again in London to consider the regulation of wages and conditions of service of persons employed in the road transport industry (goods). The committee had before it a précis of evidence submitted by the Engineering and Allied Employers' National Federation. It was stated that the federation covered practically the whole of the engineering and its allied trades in Great Britain, had a number of members using transport under "C" licences, and was therefore deeply interested in the question before the committee.

It was submitted that in the engineering industry the range of operations, the different trades and classes employed, the jobs to be undertaken, &c., were so numerous that it would be almost impossible satisfactorily to carry on the industry at all, were it not that all the classes were governed by the same machinery for dealing with and deciding the wages and working conditions. The drivers of any engineering firm's transport vehicles were in themselves a part of the ordinary personnel of the factory, and as such were covered by the same machinery. No doubt was felt by the federation that, were transport drivers under "C" licences in the engineering industry brought under the provisions of Section 93 of the Road Traffic Act, 1930—thereby involving the imposition of statutory provisions compelling conditions for such employees differing in many essentials from the conditions of all the other employees in the factory—it would cause considerable difficulties, probably of a very serious and far-reaching character, within the industry, and would interfere in a most unfortunate manner with the existing machinery.

Within the engineering industry it had been agreed over many years, both by the employers and by the trade unions concerned, that all questions affecting wages, hours, and working conditions should be dealt with between the parties concerned. Under this machinery engineering employees engaged in road transport, in the same way as the other employees in the industry, could bring forward under the procedure to which their trade unions were parties any questions affecting them as to hours, wages, working conditions, or disputes, for full investigation, consideration, and decision.

It was further urged that motor transport in the engineering industry was an integral part of that industry. It was therefore contended that "not only was there no reason whatever for bringing transport drivers of 'C' licence vehicles in the engineering industry under the provisions of Section 93 of the Road Traffic Act, 1930, but further that to do so would have an unsettling effect on the industry itself and would interfere materially with that agreed machinery between the federation and the unions which had so well stood the test of years."

The employers' organisations in the iron and steel industry also expressed strong opposition to any proposal that the decisions of the National Joint Conciliation Board should apply to "C" licence holders. It was submitted by the employers' organisations "that wages and conditions in industry required to be fixed in relation to the general circumstances of the industry and that complications would arise if the wages and conditions of one grade of workpeople in an industry were not in proper relationship with the wages and conditions of the other grades; a system under which the wages and conditions of the transport workers in an industry were subject to compulsory arbitration, whilst those of the rest of the workpeople continued to be regulated by the existing voluntary system, would raise these difficulties in an acute form."

It was stated in evidence that not only was there complete organisation of employers and employed through their respective organisations throughout the various sections of the iron and steel industry, but there was a relationship and complete negotiating machinery existing in the industry. The introduction into the iron and steel industry in respect of motor drivers employed in the industry, as an integral part of it, of the principle of their wages and conditions of service being controlled by an outside body operating under statutory authority, would have "the most far-reaching effects" upon the relationship between the employers and employed and their respective organisations and upon the industrial structure of the industry.

The employers expressed the view that it was impossible for the wages and conditions of a section—motor transport drivers—of workers in the iron and steel industry to be regulated by state machinery without immediate repercussion on the wages and conditions of the general body of workers in the industry. It was contended that the introduction into the industry of this principle of statutory regulation of wages and conditions "would be a source of endless industrial friction and would seriously prejudice the whole system of voluntary agreements which had been built up over many years." The considerations and arguments applicable to professional road haulage were entirely different from those applicable to the iron and steel industry.

The Government committee also considered a memorandum which had been prepared from material furnished by the Traffic Area Licensing Authorities.

The licensing authorities made it clear that in any suggestions they put forward they desired to preserve the utmost impartiality. They suggested that the Government committee "might find it profitable" to examine the following lines of inquiry:—

(*a*) The desirability of introducing legislation which would apply to the road transport industry (goods) the principles of either (i) the Coal Mines Minimum Wage Act, 1912, or (ii) the Agricultural Wages (Regulation) Act, 1924, setting up a statutory body, or bodies, containing representatives of both sides in the industry with an independent chairman, (similar in character to the present National Conciliation Board) to fix minimum wages and conditions of employment. The wages so established would form an implied term of the contract of employment and could be recovered in a Court of Law. A penalty could also be provided for failure to pay the proper wages.

(*b*) The practicability of extending legislation of this nature to the holders of "C" licences.

(*c*) Any legislation could also provide for the keeping of some form of wages record and inspection thereof.

(*d*) While the licensing authorities would not be concerned in the fixing of wages their powers of suspension or revocation of licences and of prosecution for breach of conditions attached to carriers' licences should be retained.

NEW YEAR MESSAGES

Mr. W. V. WOOD,
Chairman of Railway General Managers' Conference, 1937

During 1936 the British railways continued to make good progress, not only in technical efficiency, but also towards the achievement of a margin of prosperity that will permit them to function to the best advantage of the country. The prospects for 1937, as far as one can see, should further that progress. Trade and industry are dependent upon the railways and the railways are dependent upon trade and industry. There is at present no reason to doubt that the encouraging trade revival of the last few years, which was maintained last year, will be continued in 1937. But there is as yet little prospect of any substantial relaxation of restrictions on foreign trade, and in the absence of this, it is difficult to forecast a much greater momentum. The community, however, can rest assured that the railways are doing and will continue to do their utmost to serve the public interest.

LORD ASHFIELD,
Chairman, London Passenger Transport Board

We start the New Year with the knowledge that it promises to be a very full one for all of us. The Coronation will bring an exceptional number of visitors to London, not only from all parts of the Empire but also from the other countries in the world. This outstanding event will test our services to the utmost and our present high record of round about 12 million passengers a day for three consecutive days at the Jubilee in 1935 will almost certainly be exceeded. On the engineering side, the New Year will be a busy one. The new works programme, which involves an expenditure of at least £40,000,000, will get into full swing. A start will also have been made toward replacing the older type cars on the District and Metropolitan Lines with cars of new design, having more powerful equipment and air-worked doors of the push-button type. The last of the NS type buses will disappear from the streets, new coaches will replace the old, and on many routes trolleybuses will take the place of trams. Garages and depots will be extended, and new ones built. Both Acton and Chiswick works will be enlarged and replanned to provide accommodation for the maintenance of the increasing quantities of rolling stock. It will be a lively year for all of us, but we can face the task with confidence. We have collected together a competent, experienced, and thoroughly trained staff in each and every department of our organisation. It has been severely tested on many occasions in the past and has never failed. I therefore look forward to the New Year with assurance, knowing that you will all loyally do your best to maintain and increase our high reputation for public service. Our success must turn upon the good opinion the public form of us, whenever and wherever they come in contact with our undertaking. The public judge us daily; let us deserve their commendation; if we do, then we shall prosper. It is therefore with much pleasure that I take this opportunity, on behalf of the members of the board as well as of myself, to thank you one and all for your services during the past year and to wish you and the members of your family a happy and bright New Year.

SIR JOSIAH STAMP,
Chairman and President of the Executive, London Midland & Scottish Railway

At the end of a year of gratifying achievement I wish to thank each member of the staff very sincerely for the strenuous and untiring efforts which all have made for the welfare and prosperity of this great company of ours. With my congratulations on the results of the past year, I am happy to offer each L.M.S. man and woman my very best wishes for 1937. Reports from all sources continually testify to the high standard of conscientious service and courtesy found throughout the system. This reputation is one which I am proud to think is well and truly deserved. The zeal and enthusiasm which is manifested on all sides, and that sense of comradeship in the performance of a vital public service, which strikes all observers, are worthy illustrations of the best traditions of the railway world and of the L.M.S. Railway in particular. This team spirit of playing for one's side, and playing one's hardest, adds materially to the satisfaction each one of us feels at a job well and thoroughly done. We have each our contribution to make to maintain the success already achieved, and I confidently look forward, with the continued co-operation of the staff of all ranks, to a still greater measure of success in the coming year.

MR. C. M. JENKIN JONES,
Divisional General Manager, York, London & North Eastern Railway*

It is certain that without the courage born of optimism we should never have achieved our remarkable successes over adverse circumstances, and optimism is by all means to be encouraged; but may not our optimism be more stable and more fruitful if we possess it not in spite of, but because of, the past? Let us, then, see whether there are no lessons to be drawn from 1936 which will justify confidence and perseverance in 1937. We must not judge the success of a year by a string of notable events like the dates which we used to learn in history, nor entirely by the level of net receipts, but by a general survey of the fettle and health of the whole concern. The confidence that I draw from 1936 is based on my sure conviction that our efficiency is steadily increasing, and that both in men and in material we are becoming more and more fitted not only to make worthily our vital contribution to the welfare of the country, but also to hold our own, and more than hold our own, with our competitors.

As I travel up and down the country, I am more and more struck by the increasing extent to which the staff of every grade have come to regard it as their duty, as well as their interest, to work for the company's success, and not merely to consider themselves as employed to do a set amount of work per day. Accelerations, electrifications, dock extensions, colour-light signalling, modernisation of stations, improved amenities—all these are good, and all have their share in improving our results; but even more importance is to be attached to the everyday work of the staff and the good spirit in which they perform it. It is at once the strength and the weakness of our race that we leave our effort late. The method of supreme effort left late may be arresting and romantic. It may still have its place in sport, but it is bad business, and it is becoming less and less suitable to modern conditions. If we cannot command success, we can at least deserve it: you can, and I believe you will, translate into realities our good wishes for the company in 1937, and in so doing you cannot fail to contribute materially to that success and happiness which I wish you all in the year which is now beginning.

* Following the custom of the L.N.E.R., New Year messages are given in turn year by year in the *London and North Eastern Railway Magazine* by the various chief officers

SIR JAMES MILNE,
General Manager, Great Western Railway

In sending you my sincerest good wishes for a happy and prosperous New Year, I should like to take this opportunity of thanking you for the successful efforts which you have made to further the company's interests during the past year.

LONDON TRANSPORT PERMANENT WAY DINNER.—The first departmental dinner of the London Transport Permanent Way Department, Railways, was held at the Albert Restaurant, Victoria Street, S.W.1, on December 16, with Mr. J. H. Condy, Assistant Engineer (Permanent Way), in the chair. After the loyal toast had been proposed by Mr. Condy, Mr. A. R. Cooper (Chief Engineer) gave "the Permanent Way Department," to which Mr. Condy replied. Mr. J. Miller (Engineer, North-Eastern Area, L.N.E.R.), and Mr. V. A. M. Robertson (Civil Engineer, London Transport) replied on behalf of the guests to the toast proposed by Mr. K. Brinsmead. The gathering was entertained during the evening by Jean Harley and George Baker. There was an attendance of nearly 70, drawn from the technical, clerical, and supervisory grades of the department.

New Rolling-Stock and Works Programmes for 1937

A brief summary of the new 1937 rolling-stock and works programmes for the L.N.E., L.M.S., and Great Western Railways was given in our Contracts and Tenders page last week. We now give more detailed particulars of these schemes, together with the Southern Railway's 1937 rolling-stock building programme and the L.P.T.B. plans, and editorial reference is also made in this issue :—

L.N.E.R.

The L.N.E.R. has passed plans for the construction of 121 locomotives, 652 carriages, and 16,218 wagons during 1937. The new six-hour service in each direction between King's Cross and Edinburgh is to be worked by new trains specially named by Royal permission "Coronation" and, for new services between Bradford, Leeds, and London, streamlined express trains will also be used.

Engineering works of a magnitude greater than has been undertaken since the railways were first constructed are to be started on the L.N.E.R. during 1937. Some of these are being financed under the terms of the Government Assistance Loan and prominent amongst such are :—

The electrification of all L.N.E.R. lines between Sheffield, Wath, and Manchester involving conversion to electric haulage of 292·71 miles of track, the construction of 78 electric locomotives and the provision of thousands of miles of cable at a cost of £2,500,000.

The rebuilding of Colchester station with the doubling of the track between Colchester and Clacton at a cost of £170,000.

An extension of the St. Andrew's fish dock, Hull, of five acres of water space which will make it the largest fish dock in Great Britain at a cost of £750,000.

The remodelling and extension of York passenger station at a cost of £150,000. When complete the new station will have two additional platforms and existing platforms will be considerably lengthened.

Doncaster station is to be entirely rebuilt on modern lines, £250,000 being spent on this, and work has already begun.

In addition, the Felixstowe and Southend branches are to be modernised, additional lines in the form of running loops are being provided on the main line between Grantham and Doncaster, additional accommodation is being afforded for the fish traffic at Grimsby, the cross-country line between Soham (near Ely) and Newmarket is to be doubled, and additional carriage sidings are to be laid down at Edinburgh, Glasgow, and Craigendoran. All this work will absorb another £500,000. New and improved signalling apparatus is to be installed at Edinburgh (Waverley), Newcastle (Central), York, Doncaster, Hull, Glasgow, and between Shenfield and Chelmsford, York and Darlington, Clapton and Chingford. The locomotive depot at Lincoln is to be entirely remodelled.

During 1937, some 293 miles of running lines are to be entirely renewed, involving the provision of 44,000 tons of British steel rails and 586,000 sleepers. The cost of ballast alone will be £26,500, and 119 bridges are to be reconstructed and 374 stations and depots repainted.

Doncaster works is constructing 17 new streamlined Pacific engines for the Coronation and West Riding streamlined expresses and 14 more are to be built during 1937 together with 11 mixed traffic locomotives of the "Green Arrow" 2-6-2 type, 32 express engines of the "Sandringham" type, 38 freight, 6 shunting, and 20 passenger tank engines.

Construction of 652 carriages is scheduled and these will include 484 vestibuled corridor coaches for main-line trains, 11 restaurant cars, and 17 buffet cars. The remainder will be suburban coaches, and mail and parcels vans.

The L.N.E.R. plans to build 7,550 open goods wagons of which 300 will be adapted for conveying road-rail containers ; 430 covered goods wagons, and 150 fish wagons, all of which will be fitted with the continuous brake ; 1,256 bolster wagons for iron, steel, and timber traffic ; 700 cattle wagons ; 1,600 coal wagons, of which 1,200 will have a capacity beteeen 20 and 32 tons ; 14 special trestle wagons for exceptional loads ; 250 brake vans ; 59 horse boxes ; and 300 large covered containers to provide for door-to-door conveyance.

L.M.S.R.

The L.M.S.R. announces completion of the 1937 rolling stock and works programme, which will involve an expenditure of £7,650,000 on major replacements and improvements. This programme, which is quite distinct from the works which will be constructed in 1937 under the Railways (Agreement) Act, 1935, includes the provision of 105 locomotives, 210 locomotive boilers, 751 carriages, 12,305 wagons, 450 containers, 500 motor vehicles, and 500 trailers. The programme includes over £1,000,000 to be spent on the passenger traffic vehicles, details of which are now announced. Of the 751 new vehicles to be built, the programme includes 17 restaurant cars and 5 kitchen cars, 151 vestibule, 180 corridor and 293 non-corridor passenger coaches of various types, 20 horse boxes, 50 luggage and parcels vans, and 25 covered combination trucks. The stock will be of special lightweight design. Welding will be a general feature of all the new vehicles.

The L.M.S.R. will employ decorative woods of Empire origin in the interior decoration of 620 of the vehicles to be built under the 1937 programme. Ivorine tablets identifying the woods and their country of origin will be exhibited for the information of travellers (who frequently make inquiries on this point) and to direct attention to these Empire supplies. Among the woods to be used are Burmese figured teak, Grand Bassam mahogany, Nigerian kevazingo, light Nigerian cherry mahogany, Canadian figured maple butt, English and Australian oaks, and Australian walnut.

Over 96,000 tons of steel rails will be required from British manufacturers in connection with the permanent-way renewal for 1937. This part of the programme affects altogether 835½ miles of track, 614½ miles of which will be entirely relaid, while 38½ miles will be re-railed and nearly 100 miles will be re-sleepered. In addition, 68½ miles of track will be renewed with part-used rails of good quality and new sleepers, while approximately 7 miles of track in Scotland will be re-railed with good-quality part-used rails. Slightly over 7 miles of electrical conductor rails are also to be renewed on the company's electrified lines. The programme requires 1,448,000 new sleepers and 3,700 standards of crossing timbers, the greater part of which represents home and Canadian production. A very large quantity of other material will also be required for this work, including 2,575,000 wooden keys and 878,000 steel keys, 9,884,000 chair screws and ferrules, 67,000 tons of chairs, 219,000 fishplates, and 437,500 fishbolts.

G.W.R.

As already announced in our issue of November 20, the Great Western Railway programme for 1937 will cost approximately £2,000,000 and covers construction at Swindon of a total of 286 locomotives, 294 passenger coaches, 150 horse boxes, five eight-wheeled trucks, six eight-wheeled kitchen cars, and 3,940 wagons, together with a further 200 containers. Full details were given of these plans in our issue referred to above.

The bridge reconstruction programme includes work on the following : Five bridges carrying roads over the Fairford branch—at Witney, Alvescot, Lechlade (2), and Fairford ; the road bridge over the G.W.R. main line near Ealing Broadway ; the bridge carrying the railway over the River Dulais, near Newtown ; the viaduct carrying the main line over the public road and private gardens, near Keyham, Plymouth, and various other bridges are to be constructed by arrangement with local councils.

A scheme of improvements is to be carried out at Windsor station to cope with the increasing excursion traffic arriving from all parts of the country with sightseers to the castle, and in connection with rail and River Thames combined tours. Last summer 300 long excursion trains were handled at the station, and it is expected that this number will be considerably increased this year in view of the Coronation. The scheme provides for the extension of No. 1 platform, certain alterations to the platform line to accommodate longer trains, and the provision of additional facilities for the gassing and watering of the rolling stock. The station is to be redecorated and improvements carried out to the roof. In drawing up the scheme, the company has had in mind the expected traffic requirements for the Royal Agricultural Show which is to be held at Windsor in 1939.

Alterations and improvements are scheduled for stations at Criccieth, Ashton Gate, Horfield, and Truro. Sidings in the goods yard at Kidderminster are to be remodelled and new goods loop lines provided south of the station to facilitate the working of trains between Worcester and Kidderminster.

During 1937, approximately 400 track-miles of line are to be completely relaid or partially renewed in various parts of its system. The work will involve the use of the following materials: 30,000 tons of new rails, 20,500 tons of cast-iron chairs, 4,300 tons of bolts and fishplates, 5,000 loads of crossing timbers, 590,000 sleepers, 190,000 cubic yards of ballast, and 1,750,000 keys.

A further addition of 250 containers will bring the company's rail container stock up to over 2,100.

S.R.

Provision is made in the Southern Railway's 1937 rolling-stock programme for building 20 0-6-0 goods tender locomotives; 50 bogie luggage vans, and 50 four-wheeled guard's vans for passenger services; and 1,350 wagons of various types.

L.P.T.B.

The following are included in the London Passenger Transport Board programme of works for 1937:—

The last of the N.S. buses will be withdrawn, making a total of 2,500 older type buses and coaches taken off the roads since the board was established. Conversion of tramways to trolleybus services will continue and the board will seek the authority of Parliament to abolish all tramways in London.

Reconstruction of the Moorgate, Post Office, and Earl's Court stations will be completed; and the new passage and stairway at Tottenham Court Road will be in service. The new £250,000 station at Uxbridge will be opened. Reconstruction of the following stations will be undertaken: High Street Kensington, King's Cross (Metropolitan), Sloane Square, Elephant and Castle, and Edgware. Lengthening of the platforms on the Bakerloo and Central London lines to accommodate longer trains will be begun.

Contractors will begin boring for the projection of the Central London Line eastward from Liverpool Street and the extension of the Morden-Edgware line northward from Highgate. Four experimental tube trains will be placed in service. The knowledge gained will be the basis of the design of the new rolling stock required for the extensions under the £40,000,000 programme of development.

THE NEW L.M.S.R. STATION ON COVENTRY - BIRMINGHAM LINE.—The L.M.S.R. proposes to build a new station to serve the Birmingham Corporation housing estate at Lea Hall. It will be between Stechford and Marston Green stations on the L.M.S.R. Coventry-Birmingham line.

High Speed on Railways

A paper with the above title was read recently to the Newcastle-on-Tyne Section of the Institute of Transport by Mr. A. H. Earley. The author premised that the cruising speed of commercial aircraft was likely to be 200 m.p.h. in the next few years, and came to the conclusion that in a compact country like Great Britain, where most industrial centres were within a range of 200 miles, rail cruising speeds up to about 120 m.p.h. would secure for the railways freedom from air competition for the greater part of their interurban traffic.

The limitations to speed imposed by the track were treated in some detail. A speed-curvature diagram was shown giving the radius of curvature required by trains with various centres of gravity for speeds up to 200 m.p.h., which also demonstrated the need for keeping the centre of gravity of trains as low as possible. The need for long transition curves was stressed, also for vertical curves, transitioned if necessary, to overcome changes of gradient. The effect of gradients upon trains travelling at various speeds at constant horsepower was discussed, the beneficial effect in surmounting gradients possessed by high-speed trains by virtue of their large kinetic energy being illustrated by a speed velocity-head diagram for speeds up to 200 m.p.h.

Bell-mouthing of tunnel entrances, fairing of lineside structures generally, and smooth track surfacing, were mentioned as essentials to prevent excessive atmospheric disturbance on high-speed railways. For specialised high-speed lines, capable of use in conjunction with existing tracks where necessary, the Kearney system employing a single running rail with a single overhead guide rail was mentioned as having many desirable features, notably great stability at high speed.

Granted that a satisfactory track could be designed for the maintenance of very high speeds, the author stated that the problem of attaining those speeds resolved itself into reduction to a minimum of resistances to motion, and the installation of sufficient power on the train to develop tractive effort equal to those resistances at the required speeds. Tractive resistance, and the validity of existing formulæ for its computation, were examined at some length, the author showing the need for a formula which summated the separately computed items of rolling, guidance, and air resistance, and giving a warning against the use of formulæ for specific resistance in lb. per ton; since air resistance, which formed the major part of total resistance at high speed, was independent of the weight of the train.

In order to form some idea of the horsepower and energy consumption of trains for 125-m.p.h. and 150-m.p.h. cruising speeds, a formula was put forward by the author for the calculation of tractive resistance for electrically-driven articulated streamlined trains. Electric traction was assumed for this purpose, not because high speed trains must necessarily be electric, but to eliminate as many variables as possible from the calculations. Designs for 4-car 150-seat and 8-car 300-seat trains were examined, and the following conclusions reached: (*a*) 4-car trains, all axles motored, could be built for 125 m.p.h. running, with motors of reasonable horsepower, but 4-car trains for 150 m.p.h. service were practically impossible, as it would be very difficult to design motor bogies with sufficiently good riding qualities for the necessary power; (*b*) the length of a train had an enormous influence upon power and energy consumption requirements, on account of the preponderance of head air resistance at high speeds; the building of single or twin cars for very high speeds was impossible, whilst on the contrary if two 4-car 125 m.p.h. trains were coupled together their performance would improve considerably; (*c*) the energy consumption of a fully streamlined 125-m.p.h. train would apparently not exceed twice that of a conventional train running at half the speed, the much smaller variation between the maximum and minimum speeds of the faster train for the maintenance of its schedule being a notable source of economy; (*d*) trains hauled by independent locomotives were unsuitable for very high speeds, on account of the aerodynamical imperfections of a locomotive hauling other vehicles, the undesirability of concentrating in a single vehicle the large adhesive weight required for very high horsepower, and the limitation of speed on curves by high centre of gravity. This did not presuppose the complete supersession of independent locomotives, but rather their limitation to the haulage of relatively heavy and slow traffic.

The economics of running high-speed trains was treated by examination of the effect upon the main items of cost of an increase in speed. It was shown that, although the cost of fuel or energy would rise, such items of cost as depended upon more effective use of rolling stock, fixed equipment, and staff, would decline with an increase in speed. The desirability of removing speed restrictions on existing railways, and the possibilities of building entirely new high-speed lines were discussed, the author concluding by reference to future transport policy in countries of European density of population, in which railways might play a great part if properly developed.

ASSOCIATED BRITISH MACHINE TOOL MAKERS NEW TELEPHONE NUMBER.—The telephone number of Associated British Machine Tool Makers Limited, 17, Grosvenor Gardens, London, S.W.1, has been changed to Victoria 1525.

Air Conditioning and Heating of Railway Carriages

On December 17, 1936, a paper entitled "Air Conditioning and Heating of Railway Carriages" was read by Monsieur E. Damond at the Institution of Mechanical Engineers before the British Section of the Société des Ingénieurs Civils de France. In this paper air-conditioning was described as being a simultaneous adjustment of the temperature, moisture content, displacement, and cleanliness of the air. Its advantages had incited engineers to provide air-conditioning plants for vehicles used for the transport of passengers and, in particular, for railway carriages. For heating, these plants used steam, coal, fuel oil, or electric current; for cooling: ice, steam, mechanical or even chemical compressors. In all modern systems of air conditioning the equipment consisted of:—

1.—An air distribution system with filters.
2.—A heating unit.
3.—A cooling unit.
4.—A device for adding the required moisture.
5.—Control and safety devices.

With central distribution the conditioned air was delivered inside the carriage through a single opening placed at one end, in the immediate vicinity of the conditioning unit. This was the cheapest method, but it was difficult to secure an equal distribution of the conditioned air. In most cases distributing ducts were installed. The conditioned air was delivered in one or several ducts running the whole length of the carriage, along the ceiling or between the ceiling and the roof. Openings placed at convenient points ensured uniform distribution of the air in all parts of the carriage. Sometimes a system of ducts was installed at the ceiling and a second one at the floor level.

In summer the cooled air was delivered from the top and evacuated at the bottom. In winter the heated air was delivered at the bottom and evacuated at the top. The air speed was always very low. Dampers were placed in the ducts to ensure a good distribution of the air. When the system did not have a double system of ducts, top and bottom, the air introduced was evacuated through static cowls placed, generally, in the ceiling.

Heating Unit

Steam heaters consisted of tubes fed with steam from the engine. Electric heaters consisted of resistances fed by the traction current, d.c. or a.c., under a voltage varying from 600 to 3,000, according to the line supply. When carriages had to run sometimes on a steam line and sometimes on an electrified line the heating unit had to be able to work on either steam or electric current. To make it possible to heat carriages in a siding where no electric current or steam was available, a boiler was installed in each carriage. The fire was automatically extinguished as soon as the carriage was incorporated in a train.

Cooling Unit

The principal cooling systems were

A.—Ice activated
B.—Mechanical compressor.
C.—Steam.
D.—Absorption.

Ice Activated.—This system was growing in favour. There were three ways of using the ice. Water from the air conditioning unit could be sprayed on the ice, which would absorb some of its heat, enabling it to be used again for cooling. The conditioning unit could be eliminated if the air were passed through the water spray. Simplest of all, air could be passed between the walls of double walled ice containers.

Ice was not easily put on to trains at crowded stations, but loading of the refrigerant was to be simplified by making this liquid. "Liquid ice" was composed almost completely of finely divided hydric ice mixed with one or several chemical products to form a paste that could be handled by pumps or other means as easily as the water supplied to the toilet tanks on a train.

Mechanical Compressors.—In compressor systems the main circuits were the same in principle as those used in domestic refrigerators, and the gas most generally used was dichlorodifluormethane (freon). The compressor was either motor driven, energy being taken from the line, or from an axle-driven dynamo, or it was driven directly from an axle.

Other Systems.—In the steam system water from the conditioning unit was cooled by being partially evaporated in a vacuum chamber exhausted of air and vapour by a steam ejector. The absorption system was practically the same as the compressor system but the compressor was replaced by a chemical absorber.

Choice of System

There was not a wide choice of heaters but the methods of cooling were several and the most suitable was not found without considering the number of days of operation per annum, first cost, maintenance charges, and power consumption. A little-used plant should be of low first cost and cheap to maintain, but it could be relatively expensive in operation. A much used plant should be economical in operation, and it was worth while to spend much on it initially to secure this economy. The variety of systems used in the U.S.A. was to meet a variety of conditions, and comparison between systems was difficult.

Humidity and Other Controls

With steam heating, humidification was effected by the addition of steam to the plenum air under the control of an automatic hydrostat. With electric heating the humidification was obtained by introducing the necessary water into the main duct where it was changed into a mist, the action here also being under the control of a hydrostatic relay.

Passengers contributed a good deal of heat, and in one train travelling for seven hours through a night temperature of 9° C. the carriages were heated to 18° C. by thermostatically controlled steam radiators, although these were in operation for only 10 minutes.

Applications

In Europe only a few carriages were provided with complete air conditioning plant. On the Algerian Railways 62 carriages were fitted with an air cooling plant using ice; and 15 carriages with the same system ran in Roumania, Italy and France. On the other hand ventilation and warm air heating were developing rapidly. The author, taking his information from THE RAILWAY GAZETTE described the Stone system which was making headway in Great Britain. The Stone Company, it was stated, had just equipped with a compressor refrigerating unit, two first class railway carriages for the Federated Malay States Railways. The tests carried out at the works of the Birmingham Railway Carriage & Waggon Company Ltd. had given very good results.

In 1935 Switzerland, Italy, Austria, Germany, and France had exhibited to the Electric Heating Committee of the U.I.C. a train consisting of nine carriages of which two were Swiss, two Italian, one Austrian, three German and one French. These were equipped with various systems of heating and ventilation, but the French carriage was the only one providing for cooling of the air. This carriage, with nine compartments, could be cooled by ice. Air heating could be effected electrically by resistances connected so as to be suitable for either 1,000 volts a.c., or 1,500 volts d.c. or 3,000 volts d.c. The control gear was operated by the low voltage lighting equipment, and the operating switch gave six positions:—

A.—Stop.
B.—Normal heating with regulation
C.—Normal heating without regulation.
D.—Accelerated heating.
E.—Normal cooling.
F.—Accelerated cooiing.

The installation described was made in 1934 according to the process P.O. Mallet-Damond by the Cie. Auxillaire d'Entreprises Electromécaniques. This company, which was responsible for the equipment of about 5,000 carriages with electric radiators, had already equipped several hundred carriages with ventilation, air heating and cooling plant. The cooling was obtained by ice placed in metallic tanks with which the air to be cooled came into contact. This was thought to be the cheapest and safest system at present. It would supersede others when ice blocks or crushed ice were replaced by easily handled

"liquid ice." The 62 Algerian carriages were equipped with the P.O. Mallet-Damond ice system.

The Irle Damond system installed on French mail cars by the Cie. Auxillaire d'Entreprises Electromécaniques in Paris, consisted of a hot-water heating system with brine in the water to prevent freezing in winter when not in use. The circulation in the pipes and radiators was by gravity to the exclusion of any mechanical means. The water was circulated either by a firebox boiler (fed with coal in sidings or by steam if a locomotive was attached) or by two electric boilers. The ventilation in the office was ensured by Irle cowls in the ceiling of the car.

On railcars air heating was by exhaust gases from the engine, or by engine cooling water. Air cooling had not as yet been attempted.

STREAMLINED LOCOMOTIVES IN HOLLAND.—It is reported in the Dutch press that at the present time six steam locomotives are being streamlined in the workshops of the Netherlands Railways. They are five heavy express locomotives of the 4-6-0 3700 class, and one engine of the 4-6-0 3900 class, the latter being the heaviest type used on the system. It is expected that these locomotives will be ready for service in four or five months. It is also pointed out by the Netherlands Railways, in an interview granted to the press, that steam-hauled trains will gradually be replaced by electric and diesel units in so far as passenger traffic is concerned. It is the intention of the railways not to procure any more steam locomotives, and when the tests of the six engines now being streamlined have been completed, with, it is expected, successful results, all the express locomotives on the Netherlands Railways will be similarly dealt with. This work will comprise 120 engines of the 3700 class and 32 engines of the 3900 class, so that within a few years the streamlined locomotive will probably have become standard in Holland. It is further stated that experience with the streamlined locomotive now in regular service has been entirely favourable, the saving in fuel consumption being calculated to reach 10 per cent.

FIRE IN BERLIN UNDERGROUND WORKINGS.—Fire broke out at about 5 p.m. on December 27 in the section of the Berlin Nord-Sud underground tunnel now under construction beneath the Potsdamer Platz. It is thought that the fire originated in an underground ambulance room, owing to a stove overheating and it spread over an estimated distance of 500 ft., destroying workshops in the tunnel, electric wiring, and wood panelling. There were only watchmen in the tunnel at the time of the outbreak, and they were able to escape. It was not far from the scene of the fire that the tunnel collapsed on August 20, 1935 (see THE RAILWAY GAZETTE of August 23, 1935).

Argentine National Co-ordination of Transport

Messages from Argentina announce at last the passing of the National Co-ordination of Transport Bill, the first draft of which was submitted to Congress in 1932, 4½ years ago; it now only awaits promulgation in order to become law. The Bill constitutes a valuable practical instance of the benevolent treatment promised to British capital by the Argentine Government under the Anglo-Argentine Treaty, which was renewed last month, and its main provisions are as follow:—

(1) A National Commission for Co-ordinating Transport, consisting of seven members, will be set up.

(2) All public road motor transport services carrying passengers, parcels, or goods for hire must obtain a licence from the commission. (This provision will not apply to the transport of goods in vehicles owned by the seller or the purchaser or to carriers working with only one vehicle.)

(3) Services operating entirely within the confines of a single province will be exempt from the National Law, but provincial and municipal authorities have increased powers to regulate such services on their own account.

(4) The factors to be taken into account by the commission in considering applications for permits will be:—

(*a*) Public necessity and desirability of transport in the district to be served, bearing in mind such services as are already established with their existing equipment, or by providing improved equipment and service.

(*b*) Preservation of existing and future efficiency in any district, and necessity of avoiding duplication prejudicial to the general economy.

(*c*) Preference is to be given to the carriers effecting a continuous service under the best conditions as to price and time.

(5) A road maintenance fund will be created by a tax varying between 100 and 400 pesos (say £6 to £25 for each vehicle in service).

(6) All road transport tariffs must be approved by the commission, the existing tariffs to rule meanwhile.

(7) Transport companies which obtain permits will come under strict control as regards routes, schedule, tariffs, wages, and general working conditions and will be obliged to accept all goods offered to them for transport in their capacity as public carriers.

The energetic and continuous opposition to the Bill, has concentrated on the two main arguments, (*a*) that it was a measure directed against the working-classes in the interests of foreign capital, and (*b*) that the Argentine railways, though of undisputed value in the development of the country in the past, have now largely served their purpose and must make room for other forms of transport. Neither argument can be substantiated. The interests of the "small man" are especially safeguarded in the Bill, and it is the gradual widening recognition of the fact that the railways are still and must remain essential for the transport of bulky goods in large quantities over long distances that has secured a majority for the Bill.

The Bill is regarded in railway circles in London as an important step in the direction of eliminating wasteful competition and overlapping of services, though it is pointed out that the numerous exemptions for which it provides will to a certain extent offset its value.

The detrimental effect of road competition upon the Argentine railways is emphasised by Mr. Stanley Irving, Commercial Counsellor to the British Embassy in Buenos Aires in his last report issued by the Department of Overseas Trade. "Fettered as they are," he says, "no conceivable recovery in general conditions can. . . save them from the damaging effect of the competition of privileged road transport."

The complete freedom under which road transport has operated in Argentina in recent years has led to the creation of a multitude of small mushroom companies whose services have often been run without regard to the ultimate commercial results, especially from the point of view of depreciation. Cutting of passenger fares has been merciless and uneconomic, with the result that fares by microbus on some of the busiest routes are now less than half the fares by train, rigid legislation having prevented the railways from reducing their expenses in order to compete by means of wage adjustments or the dismissal of redundant personnel. At the same time the road transport companies have been in a position to pick and choose their freights, whereas the railways have been obliged to carry all merchandise offered to them, an anomaly which has in many areas reduced their traffic to a "one-way" flow of cereals yielding only a low return.

There has been an increasing recognition in recent months in Argentina of the fact that the domestic character of the service rendered by the railways has been unduly obscured by the emphasis which has been laid on the foreign nationality of the capital involved. In the course of the vigorous press campaign which has been waged for and against the Co-ordination Bill, the facts that have most conspicuously emerged are that these "foreign" companies actually carry 90 per cent. of both the exports and imports of Argentina, and that they still have a great part to play in the development of the national resources of the country.

RAILCARS IN TRIPOLI.—Two petrol-electric railcars have recently arrived in Tripoli; they will be placed in service on the line from Tripoli to Zuara and will cover the distance of 63 miles in 1¼ hours, instead of 4 hours hitherto taken by steam trains. Railcars will eventually be used for all passenger trains in Tripoli.

NOTES AND NEWS

Roffey Road Halt Closed.—This halt, which is situated 2½ miles north-west of Horsham, on the Mid-Sussex line of the Southern Railway via Crawley, served the outskirts of Roffey, a suburb of Horsham. It was closed as from January 3.

L.N.E.R. Buys Shipyard Site for Timber Yard.—Earle's shipbuilding yard has been bought by the L.N.E.R. for use as timber storage and for bogie sidings, provided negotiations can be completed satisfactorily with the timber trade. Earle's shipyard was taken over by National Shipbuilders Securities in 1932 and the yard closed and dismantled. The site is 26 acres in extent.

Construction Works in Jugoslavia.—The Jugoslav Government has accepted the tender of the Swiss engineer, Mr. Rotplaetz, builder of the Gotthard tunnel, for the construction of the railway from Pozarevac to Kucevo. The construction of the new bridge over the Danube near Turnu Severin to establish a direct connection between the Jugoslav and Roumanian railways is also to be begun this month.

L.N.E.R. "Golden Eagle" in Service.—The first of the new L.N.E.R. streamlined Pacifics for the Coronation express, *Golden Eagle*, made the first of a series of test runs with heavy main line trains on Wednesday, hauling the 1.20 p.m. Scottish express from King's Cross as far as Newcastle. The 16 sister engines of *Golden Eagle* will shortly be in service, and 14 more of the same type will be laid down at Doncaster works during this year.

Edgware Tube Extension.—Harrow Council has decided to lodge a petition opposing the London Passenger Transport Board's Bill to extend the Edgware-Morden tube to the Elstree Road, near its junction with Watford by-pass road. It is considered the scheme will injure the Aldenham reservoir district, and another ground of opposition is that a portion of the land within the limits of deviation on the deposited map is scheduled as part of the London green belt scheme.

Institution of Electrical Engineers: Annual Dinner.—The annual dinner and reunion of the institution will be held in the Great Room at Grosvenor House, Park Lane, W.1, on Thursday, February 4, under the presidency of Mr. H. T. Young, supported by the council. Applications for tickets should be made as early as possible, and tickets will be allotted in the order in which the applications are received. The charge is 12s. 6d. for each cover, exclusive of wine.

New L.M.S.R. Station for Liverpool District.—In order to serve a rapidly-developing residential area, the L.M.S.R. is to provide a new station at Marshalls Cross, three-quarters of a mile from the present Lea Green station on the Liverpool and Kenyon Junction section. The new station will be more convenient for the new housing estates than Lea Green station, and when the former is brought into use the latter will be closed.

L.N.E.R. Property Sale.—According to *The Times*, the L.N.E.R. is disposing of freehold interests in certain property near Finchley Road station. The preliminary announcement by Messrs. Rees-Reynolds & Hunt (Lincoln's Inn Fields), who are to hold the auction, mentions that "the investment is secured upon 33 houses" in Broadhurst Gardens, let at a gross rental of £4,247 a year.

The L.P.T.B. Monopoly at Datchet.—Datchet Parish Council has sent a resolution to the Ministry of Transport asking that the London Passenger Transport Board be relieved of its monopoly on the Datchet-Slough route in order that a private undertaking may run buses for the convenience of the public. According to *The Times*, it was stated at a recent meeting that almost every time a bus left the village for Slough seven or eight people were left behind and that all pleas to the board had failed to bring a remedy.

New British Agent for Schütte Machine Tools.—E. H. Jones (Machine Tools) Limited, has been appointed sole agent in Great Britain, from January 1, for Alfred H. Schütte, Cologne, Germany, maker of the Schütte automatics and other machine tools. A complete service department with stocks of spares and accessories is being installed at the firm's London address, the Hyde, Hendon, N.W.9. The former agent, A. C. Wickman Limited, by arrangement with E. H. Jones (Machine Tools) Limited, is still in a position to supply spare parts and accessories to existing users of Schütte automatics.

Railcars on the Bhavnagar State Railway.—Very satisfactory results are reported to have attended a 244-mile trial recently carried out from Bhavnagar Para to Mahuva and back with one of two Thornycroft railcar sets now in operation on the Bhavnagar State Railway. The test route is difficult and sharply curved, and speed is limited to 35 m.p.h. The railcars are powered by two Thornycroft 45-h.p., four-cylinder petrol engines, giving economical operation at 30 m.p.h. and a maximum speed of about 40 m.p.h. on an easy down grade. Each set, one of which is illustrated on page 58, accommodates 70 passengers.

L.N.E.R. London City Manager's Social.—The sixth annual dinner and dance of the London City Manager's staff, L.N.E.R., was held at the Liverpool Street Hotel on December 30, under the chairmanship of Mr. Percy Syder, London City Manager. Over 250 members of the staff were present. In proposing the toast of the London & North Eastern Railway, Mr. Syder expressed his gratitude to all those who had gone out of their way to secure traffic for the company outside office hours. He was very pleased to be the captain of so excellent a team. It had also given him pleasure to present to several members of his staff in the past year long service efficiency awards for ambulance work, and he appealed to all to join the movement.

Canadian Pacific Earnings.—Gross earnings of the Canadian Pacific Railway for the month of November, 1936, amounted to $12,117,000, an increase of $258,000 in comparison with November, 1935. In the working expenses of $8,578,000 there was an increase of $175,000, leaving net earnings $83,000 higher, at $3,539,000. Aggregate gross earnings for the first eleven months of 1936 were $126,310,000, an improvement of $8,212,000, and the net earnings of $19,770,000 were higher by $678,000.

Canadian National Earnings.—For the month of November, 1936, gross earnings of the Canadian National Railways amounted to $16,151,674, an increase of $903,968 over November, 1935. Operating expenses ($13,768,403) advanced by $849,852, to leave net earnings of $2,383,271, which were $54,116 higher than for November, 1935. Aggregate gross earnings from January 1 to November 30, 1936, were $169,386,264, an improvement of $11,215,644, and the net earnings for the eleven months were $135,471 higher, at $12,227,251.

Italian State Tourist Office in London.—The London office of the Italian State Tourist Department (E.N.I.T.), which has been established for many years at Waterloo Place, has moved to Sackville House, 38, Piccadilly, W.1, where Italian works of art will be exhibited, and where inquiries may be made on all matters relating to travel to and in Italy. The function of the E.N.I.T. is to make the attractions of Italy more widely known and to assist travellers and tourist agents by supplying descriptive booklets of all parts of the country, giving accurate information regarding local conditions, &c. No commercial business whatever is conducted.

Northern Ireland Traffics.—Passenger receipts for the first nine months of 1936 on railways wholly in Northern Ireland amounted to £237,526, against £217,442 for the corresponding period of 1935, with an improvement from 4,721,911 to 4,925,455 in the number of passengers (apart from season ticket holders) carried. Merchandise and mineral tonnage for the nine months advanced from 400,398 tons to 449,131 tons, and the total goods traffic receipts from £133,161 to £165,488. Railways partly in Northern Ireland carried 4,627,815 ordinary passengers in the first nine months of 1936, against 4,721,911 in the first nine months of 1935, but total passenger receipts improved from £351,125 to £366,303. The quantity of merchandise and minerals carried fell from 715,110 tons to 696,550 tons, although total goods traffic re-

ceipts rose from £460,390 to £470,331. On the purely northern railways the number of livestock carried during the nine months advanced from 141,418 to 150,008, but on the cross-border railways it fell from 557,899 to 556,701.

Swedish Winter Sports Services.—The Swedish State Railways and the Bergslagerna Railway Company are arranging to run a comprehensive number of additional trains to winter sports centres in Jämtland and Härjedalen, beginning on January 16 and later dates. The principal additional services will be between Stockholm and Jämtland, Gothenburg and Jämtland, Gothenburg and Härjedalen via Örebro-Bollnäs, and also via Kristinehamn, and Stockholm and Härjedalen. Through first, second and third class sleeping cars will run on the night trains of all these services.

Modernising the Grand Hotel, West Hartlepool.—The L.N.E.R. has decided to improve and modernise the Grand Hotel, West Hartlepool. It is to be redecorated, and a new cocktail bar, lounge, and cloakroom are to be provided, as well as additional bedroom accommodation. Running water will be fitted in every bedroom and the number of bathrooms is to be increased. An interesting feature in this connection is that five of the extra bathrooms will be so arranged as to provide, if required, five private suites each complete with private bathroom. The kitchens and service rooms are to be altered and re-equipped with the latest types of cooking appliances and new quarters are to be provided for the staff.

Road Accidents.—The Ministry of Transport return for the week ended January 2, is as follows. The figures in brackets are those for the corresponding period of last year :—

	Killed, including deaths resulting from previous accidents		Injured	
England ..	143	(106)	3,368	(2,769)
Wales	6	(5)	102	(117)
Scotland ..	22	(14)	384	(267)
	171	(125)	3,854	(3,153)

The total fatalities for the previous week were 158, compared with 145 for the corresponding period of 1935. Future returns will be issued monthly.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 1st Week			Totals to Date		
	1937	1936	Inc. or Dec.	1937	1936	Inc. or Dec.
L.M.S.R. (6,914¼ mls.)	£	£	£	£	£	£
Passenger-train traffic...	396,000	377,000	+ 19,000	396,000	377,000	+ 19,000
Merchandise, &c. ...	402,000	383,000	+ 19,000	402,000	383,000	+ 19,000
Coal and coke ...	240,000	261,000	− 21,000	240,000	261,000	− 21,000
Goods-train traffic ...	642,000	644,000	− 2,000	642,000	644,000	− 2,000
Total receipts	1,038,000	1,021,000	+ 17,000	1,038,000	1,021,000	+ 17,000
L.N.E.R. (6,332 mls.)						
Passenger-train traffic...	287,000	269,000	+ 18,000	287,000	269,000	+ 18,000
Merchandise, &c. ...	291,000	286,000	+ 5,000	291,000	286,000	+ 5,000
Coal and coke ...	250,000	224,000	+ 26,000	250,000	224,000	+ 26,000
Goods-train traffic ...	541,000	510,000	+ 31,000	541,000	510,000	+ 31,000
Total receipts	828,000	779,000	+ 49,000	828,000	779,000	+ 49,000
G.W.R. (3,746½ mls.)						
Passenger-train traffic...	179,000	168,000	+ 11,000	179,000	168,000	+ 11,000
Merchandise, &c. ...	170,000	161,000	+ 9,000	170,000	161,000	+ 9,000
Coal and coke ...	110,000	115,000	− 5,000	110,000	115,000	− 5,000
Goods-train traffic ...	280,000	276,000	+ 4,000	280,000	276,000	+ 4,000
Total receipts	459,000	444,000	+ 15,000	459,000	444,000	+ 15,000
S.R. (2,153 mls.)						
Passenger-train traffic...	268,000	246,000	+ 22,000	268,000	246,000	+ 22,000
Merchandise, &c. ...	54,500	50,500	+ 4,000	54,500	50,500	+ 4,000
Coal and coke ...	37,500	36,500	+ 1,000	37,500	36,500	+ 1,000
Goods-train traffic ...	92,000	87,000	+ 5,000	92,000	87,000	+ 5,000
Total receipts	360,000	333,000	+ 27,000	360,000	333,000	+ 27,000
Liverpool Overhead ... (6¼ mls.)	1,234	1,179	+ 55	1,234	1,179	+ 55
Mersey (4½ mls.) ...	4,664	4,559	+ 105	4,664	4,559	+ 105
*London Passenger Transport Board ...	547,200	559,400	− 12,200	15,154,400	14,706,400	+ 448,000
IRELAND						
Belfast & C.D. pass. (80 mls.)	—‡	—‡	—‡	—‡	—‡	—‡
,, ,, goods	—‡	—‡	—‡	—‡	—‡	—‡
,, ,, total	—‡	—‡	—‡	—‡	—‡	—‡
†Great Northern pass. (543 mls.)	9,850	9,305	+ 545	564,600	544,855	+ 19,745
,, ,, goods	6,800	7,530	− 730	496,300	494,280	+ 2,020
,, ,, total	16,650	16,835	− 185	1,060,900	1,039,135	+ 21,765
†Great Southern pass. (2,067 mls.)	35,386	31,743	+ 3,643	1,879,846	1,823,398	+ 56,448
,, ,, goods	47,091	46,571	+ 520	2,313,467	2,170,145	+ 143,322
,, ,, total	82,477	78,314	+ 4,163	4,193,313	3,993,543	+ 199,770

* 27th week. † 52nd week. ‡ Returns not to hand.

British and Irish Railways Stocks and Shares

Stocks	Highest 1936	Lowest 1936	Prices Jan. 6, 1937	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	64¼	45½	64	−1
5% Con. Prefce ...	126½	116¾	126	+½
5% Red.Pref.(1950)	113	108½	110½	—
4% Deb.	119½	110½	113	—
4½% Deb. ...	121	114	117½	—
4½% Deb. ...	129	121	124½	—
5% Deb.	141	134	136½	—
2½% Deb. ...	79⅛	74	75½	—
5% Rt. Charge ...	136½	130	133½	—
5% Cons. Guar. ...	135¼	127¾	133	—
L.M.S.R.				
Ord.	35⅝	17	35	+1
4% Prefce. (1923)	83	52½	82	+½
4% Prefce. ...	92¾	81	91½	—
5% Red.Pref.(1955)	109¼	103¼	107	—
4% Deb.	111¾	105 9/16	107½	—
5% Red.Deb.(1952)	119⅝	115½	116½	—
4% Guar. ...	106¾	101⅝	103½	−1
L.N.E.R.				
5% Pref. Ord. ...	14	9	12	—
Def. Ord. ...	7¼	4¾	6	−⅛
4% First Prefce.	79¼	55¼	78½	+1
4% Second Prefce.	31⅞	18¼	29	—
5% Red.Pref.(1955)	100½	77¾	100	+½
4% First Guar. ...	104½	98¾	102	—
4% Second Guar.	99	90	97½	—
3% Deb.	85¾	79	83½	—
4% Deb.	109¾	104½	107	—
5% Red.Deb.(1947)	116¼	110½	112½	—
4½% Sinking Fund Red. Deb.	111½	107½	109½	—
SOUTHERN				
Pref. Ord. ...	98¾	82½	97	+1
Def. Ord. ...	27⅝	20⅛	26	—
5% Prefce. ...	120¾	118½	125	—
5% Red.Pref.(1964)	119¾	115¼	117½	—
5% Guar. Prefce.	136	129½	133½	—
5% Red.Guar.Pref. (1957)	120	115¾	117½	—
4% Deb.	117 3/16	109½	112	—
5% Deb.	140	134	135½	—
4% Red. Deb. 1962–67	116½	110	112½	+½
BELFAST & C.D.				
Ord.	9	4½	5	—
FORTH BRIDGE				
4% Deb.	107	105	104½	—
4% Guar. ...	107 3/16	104	104½	—
G. NORTHERN (IRELAND)				
Ord.	19½	9¾	12	—
G. SOUTHERN (IRELAND)				
Ord.	63	41	58½	—
Prefce.	65	46	61	−4
Guar.	97¼	81	93½	−½
Deb.	99¾	83¼	95	—
L.P.T.B.				
4½% "A" ...	127¾	121	123½	—
5% "A" ...	138¼	133½	135½	—
4½% "T.F.A." ...	111½	108⅛	109	—
5% "B" ...	131¾	123¾	124½	—
"C"	112½	93	99	+1
MERSEY				
Ord.	40¾	23	41½	—
4% Perp. Deb. ...	103	98	101	—
3% Perp. Deb. ...	78	74⅝	77½	—
3% Perp. Prefce.	68⅞	63¼	67½	—

CONTRACTS AND TENDERS

The Southern Railway new rolling-stock programme for 1937 covers construction of 20 0-6-0-type goods tender locomotives, 50 bogie passenger luggage vans, five four-wheeled guards vans, and 1,350 wagons of various types. Further details of the L.M.S.R., L.N.E.R. and G.W.R. new rolling-stock and works programmes are given on another page of this issue, together with the 1937 plans of the London Passenger Transport Board.

The Metropolitan-Cammell Carriage & Wagon Co. Ltd. has received an order from the Gaekwar's Baroda State Railway, to the inspection of Messrs. Rendel, Palmer & Tritton, for 81 four-wheeled underframes, complete with wheels and axles, for salt wagons.

Frank How & Co. Ltd. has secured a very large order for lubricating oil from the Great Western Railway, the blending of which is being carried out in its entirety at the Stratford works of Frank How & Co.

The Metropolitan-Vickers Electrical Co. Ltd. has received a part contract from the Great Northern Railway (Ireland) for the supply of Cosmos electric lamps for the period of twelve months ending December 31, 1937.

Greenwood & Batley Limited has received an order from the Great Western Railway for four Greenbat electric tractors, type STD, fitted with Edison batteries for use at Paddington station.

The Soc. Italiana Ernesto Breda has received from the Italian State Railways an order for 80 double-bogie railcars of 260 b.h.p. They are to have Breda-A.E.C. 130-b.h.p. diesel engines, Wilson epicyclic gearboxes, and Vulcan-Sinclair fluid couplings, all of which are being built by Breda under licence.

The Italian State Railways Administration is to place orders in Italy for eight further high-speed triple-car electric trains for the 3,000-volt d.c. lines.

W. G. Bagnall Limited has received an order for six sets of locomotive coupling rods from the Antofagasata (Chili) & Bolivia Railway.

Airvac Limited has received an order from the Chinese Government Purchasing Commission for 300 airvac carriage roof ventilators, required for carriage stock on the Canton-Hankow Railway, to be supplied to the inspection of Messrs. Sandberg.

Robert Stephenson & Co. Ltd. has received an order from the Controller of Stores, North Western Railway of India, for 30 locomotive connecting rods.

The Gregg Car Company has received an order from the Assam-Bengal Railway Administration, to the inspection of Messrs. Rendel, Palmer & Tritton, for 36 four-wheeled underframes M.C. type, and 20 four-wheeled platform trailers without wheels and axles.

The Gloucester Railway Carriage & Wagon Co. Ltd. has received an order from the Sudan Railways for four bogie carriage underframes for fourth class coaches, complete with wheels and axles and vacuum brake gear. Two of the underframes will also be supplied with electrical equipment.

Further Wirral Electrification Contracts

The L.M.S.R. has placed further orders with British manufacturers in connection with the electrification of the Wirral lines from Birkenhead Park to West Kirby and New Brighton, as follow :—

H. Fairclough Howley and Williams, Tarr & Co. Ltd. : Erection of substations.
Tyer & Company : Circuit breakers.
Herbert Morris Limited : Crane.
Siemens & General Electric Railway Signal Co. Ltd. : Track circuits.
British Thomson-Houston Co. Ltd. : Motor equipment.
Railway Signal Co. Ltd. : Signalling.
Johnson & Phillips Limited : Copper wire.
Mersey Cable Works : Track cable.

Bayliss, Jones & Bayliss Limited has received an order for 10,000 fishbolts and nuts for 65-lb. rails from the Argentine North Eastern Railway.

The Hydraulic Coupling & Engineering Co. Ltd. has received an order for three Voith-Sinclair hydraulic transmission equipments to be installed in three of the Ganz railcars ordered by the Buenos Ayres Pacific Railway. These turbo transmissions are required to transmit continuously 210 h.p. at an engine speed of 1,170 r.p.m. plus 25 h.p. for auxiliary drives.

The Chinese Government Purchasing Commission has placed the following orders for equipment required for the Canton-Hankow Railway, to be supplied to the inspection of Messrs. Sandberg :—

Brown Bayleys Steel Works Limited, 144 tyres.
G. D. Peters & Co. Ltd., 202 carriage blinds.
Westinghouse Brake & Signal Co. Ltd., brake equipment.
Whitelegg & Rogers, 48 hard and soft grease guns.
Howell & Company, 1,233 boiler and flue tubes.

The English Steel Corporation has received an order from the Bengal-Nagpur Railway for 181 locomotive tyres.

The South Indian Railway Administration has placed orders to the inspection of Messrs. Robert White & Partners with Steel, Peech & Tozer Limited, for 13½ tons of spring steel and with Hurst, Nelson & Co. Ltd. for 90 pairs of sliding doors for brake vans.

The Westinghouse Brake & Signal Co. Ltd. has received a large order for mechanical signalling equipment from the Chinese Government Purchasing Commission. This equipment is required for the Canton-Hankow Railway, and is to be supplied to the inspection of Messrs. Sandberg.

Fried. Krupp A.G. has been awarded the contract for the construction of the Samanoud bridge over the Nile in Egypt.

Fried. Krupp, A.G., has also received an order from the Controller of Stores, North Western Railway of India, for 180 coupling rods, grease lubricated.

The directors of the Great Western Railway have authorised the placing of the following contracts :—

R. A. Dyson & Co. Ltd. : Supply of three 10-ton pole trailers for use with road vehicles.

W. & A. Edgell Limited : Supply and erection of timber-framed warehouses at Cirencester and Bridgnorth.

W. T. Nicholls Limited : Construction of additional accommodation over the parcels depôt at Bishops Road, Paddington.

Automatic Telephone & Electric Co. Ltd. : Provision and installation of a 50-line inter-communication automatic telephone exchange at Paddington.

Horseley Bridge & Thomas Piggott Limited : Supply and erection of a swingbridge over the Junction Cut between Nos. 1 and 2 Docks at Barry.

For Swindon Works

T. Robinson & Son Limited : One vertical multiple spindle boring machine.

The Churchill Machine Tool Co. Ltd. : One universal tool and cutter grinder.

Craven Bros. (Manchester) Limited : One ground wheel lathe.

H. W. Ward & Co. Ltd. : One combination turret lathe.

Taylor Brothers & Co. Ltd. has received orders for 100 pairs of wagon wheels and axles and 20 pairs of wheels and axles for coaches, all with solid rolled steel disc-type wheels, from the Antofagasta (Chili) & Bolivia Railway.

The Egyptian State Railways Administration has placed orders for a total of 400 four-wheeled box trucks, divided as follow :—Metropolitan-Cammell Carriage & Wagon Co. Ltd., 250, and Ringhoffer, 150.

The British Thomson-Houston Co. Ltd. has received an order from the Egyptian State Railways Administration for electric lamps.

G. Salter & Co. has received an order from the Egyptian State Railways Administration for helical springs (Ref. E.S.R. 21,568, total cost £406 13s. 4d., delivery f.o.b. English port).

William Jones Limited has received an order from the Egyptian State Railways Administration for 247 metric tons of cotton waste (Ref. E.S.R. 343 G 3/23, total cost £E.3,371, delivery f.o.b. Manchester).

F. Braby & Co. Ltd. has received an order for 3,475 galvanised corrugated roof sheets for wagons from the Central Argentine Railway.

The Swedish State Railways Administration has bought 19,400 tons of British coal, namely, 15,400 tons of engine coal of the Maude, Broomhill and Lambton brands, at prices varying

between 20s. 5d. and 24s. 0d. a ton, 2,000 tons of steam coal, DBC at 23s. 9d. and 2,000 tons of bunker coal, Whorlton screened, at 24s. 9d.

George Spencer Moulton & Co. Ltd. has received an order for 4,000 patent india-rubber concentric springs from the Buenos Ayres Great Southern Railway.

Steel, Peech & Tozer Limited has received an order from the Egyptian Delta Light Railways Administration, to the inspection of Messrs. Rendel, Palmer & Tritton, for 104 locomotive tyres.

Robert Hudson Limited has received an order for 140 Decauville trucks for coaling locomotives in running sheds, 100 being for the Buenos Ayres Great Southern Railway and 40 for the Buenos Ayres Western Railway.

Guest, Keen & Nettlefolds Limited has received an order for 10,000 steel fishbolts and nuts for 47½-lb. rails from the Entre Rios Railways.

The Norfolk & Western Railroad has ordered 40,000 tons of rails, of which 30,000 tons are to be supplied by the Carnegie Illinois Steel Corporation, and 10,000 tons by the Bethlehem Steel Corporation. In addition, an order has been placed with the Bethlehem Steel Corporation for 1,000 coal cars. The Pennsylvania Railroad is to purchase 2,500 freight cars; the Erie Railroad, 1,500; the Illinois Central, 2,000; the Missouri, Kansas and Texas, 1,150; while 1,400 freight cars are to be bought by the Nickle Plate Railroad.

The Chinese Government Purchasing Commission has placed orders to the inspection of Messrs. Fox & Mayo for equipment required for the Canton-Hankow Railway as follows:—

Cowans Sheldon & Co. Ltd., Two Sets of hoist type jacks for sheds.

J. W. Carr & Company, 20 Rack and pinion type jacks.

Associated British Machine Tool Makers Limited, One 8½-in. centre sliding surfacing and screw-cutting lathe.

Cravens Railway Carriage & Wagon Co. Ltd., 24 Pairs of wheels and axles.

Henry Broadbent Limited, One 22½-in. × 21-ft. 6-in. motor-driven high-speed heavy-duty lathe.

The Bombay, Baroda & Central India Railway Administration invites tenders, receivable by January 22 at the White Mansion, 91, Petty France, Westminster, S.W.1, for wagon tyres and axles, and receivable by January 29 for steel material (plates, angles, and rounds) and a wheel lathe.

The South African Railways & Harbours Administration is calling for tenders (Tender No. 1175) for the supply and delivery of approximately 290 tons of steelwork and approximately 8 tons of rivets, bolts, nuts, &c., for bridgework. Tenders endorsed "Tender No. 1175 for Bridgework" should reach the Chief Stores Superintendent, Park Station Chambers, Rissik Street, Johannesburg, by February 15.

The Rand Water Board is calling for tenders (Contract No. 479) for the supply and delivery at the board's main pumping station at Vereeniging of: One 24-in. gauge railway locomotive (diesel, battery, or paraffin type) and one electric motor-driven hoist for ash handling, capable of hoisting two loaded U trucks through a height of approximately 33 ft. (erection also to be undertaken). Tenders endorsed "Contract No. 479—Tender for Ash Handling Plant, Vereeniging," should reach the Secretary, Rand Water Board, 74, Commissioner Street, Johannesburg by February 9.

The Indian Stores Department is calling for tenders, receivable by February 13, in New Delhi, for the supply and delivery of two 10-ton broad-gauge hand-operated travelling jib cranes complete with wheels and spare parts.

The South African Railways & Harbours Administration is calling for tenders, to be presented in Johannesburg by March 1, for the supply of structural iron and steelwork, &c., for the erecting shop at Uitenhage.

The South African Railways & Harbours Administration is calling for tenders (Tender No. 1163) for the supply and delivery of:—

Five locomotive boilers, standard type No. 2, for engines Classes 12 and 12B,

10 locomotive boilers, standard type No. 2, for engines Class 14C,

Eight locomotive boilers, standard type No. 2A, for engines Classes 15 and 15A, and

Seven locomotive boilers, standard type No. 2B, for engines Classes 16, 16B and 16C.

Tenders endorsed "Tender No. 1163 Locomotive Boilers" should reach the Secretary to the Tender Board, South African Railways, Headquarters Offices, Johannesburg, by March 8.

Fast Running on the G.W.R.

On New Year's Day a remarkable run was made by the G.W.R. Cheltenham Flyer, which in the course of the journey from Swindon to Paddington covered the 18 m. 6 c. from Uffington to Cholsey in precisely 12 min., at an average speed of 90·4 m.p.h. The gradients are slightly in favour of the locomotive, but at their steepest the inclination is no more than 1 in 660, and a good proportion of the distance is level track. The average speed, calculated from the exact station-to-station chainages, was 90·0 m.p.h.

G.W.R. SWINDON–PADDINGTON

Engine: 4-6-0 No. 5055, *Lydford Castle*.
Load: 7 coaches, 219 tons tare, 230 tons gross.

Distance miles		Sched. min.	Actual min.	sec.	Speeds m.p.h.
0·0	SWINDON ..	0	0	00	—
5·8	Shrivenham ..	—	6	43	79
10·8	Uffington ..	—	10	22	85
13·4	Challow	—	12	08	90
16·9	Wantage Road ..	—	14	25	92½
20·8	Steventon ..	18½	16	58	91½
24·2	DIDCOT	21	19	13	90
28·8	Cholsey	—	22	22	86½
32·6	Goring	—	25	02	79
35·8	Pangbourne ..	—	27	32	76½
38·7	Tilehurst	—	29	46	77½
41·3	READING ..	34	31	47	76½
46·3	Twyford	38	35	38	80½
53·1	Maidenhead ..	43	40	33	83½
54·8	Taplow	—	41	49	85
58·8	SLOUGH ..	47½	44	39	85
64·1	West Drayton ..	—	48	26	79
68·2	Southall	54½	51	33	77½
71·6	Ealing	—	54	10	Eased
76·0	Westbourne Park	61	59	00	—
77·3	PADDINGTON	65	61	49	—

On New Year's Day a remarkable run was made by the G.W.R. Cheltenham Flyer, which in the course of the journey from Swindon to Paddington covered the 18 m. 6 c. from Uffington to Cholsey in precisely 12 min., at an average speed of 90·4 m.p.h. The gradients are slightly in favour of the locomotive, but at their steepest the inclination is no more than 1 in 660, and a good proportion of the distance is level track. The average speed, calculated from the exact station-to-station chainages, was 90·0 m.p.h. from Uffington to Challow, 91·7 m.p.h. from Challow to Wantage Road, with a maximum of 92½ m.p.h., 91·1 m.p.h. from Wantage Road to Steventon, 90·7 m.p.h. from Steventon to Didcot, and 88·8 m.p.h. to Cholsey; and this remarkably uniform exhibition was given in face of very unfavourable weather conditions, with high wind (though this was in part a following wind) and heavy rain. The engine was 4-cylinder 4-6-0 No. 5055, *Lydford Castle*, and the load seven coaches, weighing 219 tons tare and 230 tons with passengers and luggage. Between Uffington and Steventon these times were 13 sec. faster than those of the record run of June 6, 1932, notwithstanding the fact that on this later run the engine was hauling an additional coach.

As regards the remainder of the journey, the engine was eased between Didcot and Reading, where the speed varied chiefly between 76 and 77½ m.p.h., but at Twyford speed was again 80½ m.p.h., at Maidenhead 83½ m.p.h., and at Slough 85 m.p.h., remaining above the eighty line till near West Drayton, where a further easing took place to avoid too early an arrival. Paddington was reached in 61 min. 49 sec. for the 77·3 miles from Swindon, but with faster running from Didcot to Reading, and inwards from Southall, a time of less than an hour could very easily have been achieved. Details of the run are set out in the annexed table; the times and speeds were recorded by Mr. Cecil J. Allen.

On the same date a fine run was made by No. 5056, *Ogmore Castle*, of the same class, on the down Bristolian, with a seven-coach load of 222 tons tare, and 230 tons gross. Didcot, 53·1 miles from Paddington, was passed in 45 min. 13 sec., the 34·6 miles from Slough having been covered in 26 min. 18 sec., at an average of 79 m.p.h.; three severe signal checks were experienced between there and Swindon, making the time 70 min. 3 sec. for the 77·3 miles from London, and to Wootton Bassett 75 min. 3 sec. for the 82·9 miles; but with the help of maximum speeds of 90 m.p.h. at Dauntsey and 91¾ m.p.h. at the west end of Box tunnel, with an intervening minimum as high as 75 m.p.h. at Corsham, Bristol was reached, notwithstanding the usual slack through Bath, in 2 sec. under the scheduled time 105 min. Net time for the 117·6 miles probably did not exceed 100 min.—a start-to-stop average of 70·6 m.p.h.

LEGAL NOTICES

In the Court of the Railway Rates Tribunal.

Road and Rail Traffic Act, 1933.
Agreed Charges.

NOTICE IS HEREBY GIVEN that Applications for the approval of Agreed Charges under the provisions of Section 37 of the Road and Rail Traffic Act, 1933, short particulars of which are set out in the Schedule hereto, have been lodged with the Railway Rates Tribunal.

The Procedure to be followed in regard to the inspection of the said Applications and the filing of Notices of Objections is that published in the "London Gazette" of 28th July, 1936.

Printed copies of the Procedure can be obtained from the Office of the Tribunal, Bush House, Aldwych, London, W.C.2.

Notices of Objection to any of the said Applications must be filed on or before the 28th day of January, 1937.

A copy of each Application can be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, 35, Parliament Street, Westminster, London, S.W.1, price 1s. post free.

L. C. JACKSON,
Acting Registrar.

6th January, 1937.

Number of Application	Name of Trader and General Description of Traffic
1936—No. 592	MUNDUS AND J. & J. KOHN LIMITED, 50, Great Eastern Street, London, E.C.2; Bentwood Furniture. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
1936—No. 593	PASHON PRODUCTS LIMITED, Trading Estate, Slough; Cordials and Preserves.
1937—No. 1	AUSTIN REED LIMITED, Summit House, Red Lion Square, London, W.C.1; Articles for sale or use at the Trader's Branch Shops and Returned Articles, &c.
1937—No. 2	B. BEDDOW & SONS LTD., Battersea Park Road, London, S.W.11; Polishes, Boot Cleaning Outfits, Cloth Balls, Grease Removers, &c.
1937—No. 3	THE BRITISH BROADCASTING CORPORATION, Broadcasting House, Portland Place, London, W.1; Periodicals.
1937—No. 4	CARRS (BIRMINGHAM) LIMITED, Keeley Street Mills, Birmingham; Paper, &c.
1937—No. 5	J. C. & J. FIELD LIMITED, 15, Upper Marsh, Lambeth, London, S.E.1; Soap, Candles, Druggists' Sundries, Toilet Preparations, Groceries, Hardware, Tinware, &c.
1937—No. 6	WM. O'HANLON & CO. LTD., 49 & 51, Dale Street, Manchester; Cotton and Linen Goods, Rollers for Blinds, Brasswork.
1937—No. 7	THE SANITAS CO. LTD., 51, Clapham Road, London, S.W.9; Chemical Closets, Drugs and Druggists' Sundries, Patent Foods and Medicines, Disinfectants, Floor Polish, Hardware, &c. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
1937—No. 8	J. SMITH, HARGREAVES & CO. LTD., 8, New Brown Street, Manchester; Towelling and Shirting. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
1937—No. 9	THOS. WITTER & CO. LTD., 86, York Road, King's Cross, London, N.1; Balatum Squares.
1937—No. 10	ACKLAND & PRATTEN LIMITED, Portland Works, Bristol, 2; Paper, Stationery, &c.
1937—No. 11	ACME WRINGERS LIMITED, David Street, Glasgow, S.E.; Washing Machines, Wringing Machines, Stands and Table Tops.
1937—No. 12	ALLIED SUPPLIERS LIMITED, 179/189, City Road, London, E.C.1; Multiple Shop Traffic (Provisions, &c.).
1937—No. 13	BRITISH PATENT PERFORATED PAPER CO. LTD., Atlas Works, Berkshire Road, Hackney Wick, London, E.9; Toilet Paper, Paper Towels, Paper for Cash Tills or Time Recorders, &c.
1937—No. 14	THE CALOR-GAS (DISTRIBUTING) CO. LTD., 17–18, Margaret Street, London, W.1; Butane Gas.
1937—No. 15	THE CARBORUNDUM CO. LTD., Trafford Park, Manchester; Emery Wheels, Scythe Stones, and Abrasives.
1937—No. 16	WM. COLLINS, SONS & CO. LTD., 144, Cathedral Street, Glasgow, C.4; Books, Magazines, Papers, &c. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
1937—No. 17	GEO. T. COX & SONS LTD., 31, King William Street, London, E.C.4; Groceries, Preserves and Provisions, Disinfectants, Druggists' Sundries, Oilmen's Sundries, Stationery, Manufactured Tobacco, &c.
1937—No. 18	J. A. CRABTREE & CO. LTD., Lincoln Works, Walsall; Electrical Accessories and Fittings, &c.
1937—No. 19	THE DISTRIBUTERS & TRANSPORTERS LIMITED (MESSRS. UNILEVER'S DISTRIBUTING ORGANISATION), Unilever House, Blackfriars, London, E.C.4; Candles, Soap, &c. (*Applicable also to traffic consigned by five Associated or Subsidiary Companies.*)
1937—No. 20	A. C. FINCKEN & CO., 197, Great Portland Street, London, W.1; Force.
1937—No. 21	A. C. FINCKEN & CO., 197, Great Portland Street, London, W.1; Soap.
1937—No. 22	A. GUINNESS SON & CO. LTD., St. James's Gate Brewery, Dublin; Empties returned to the Trader's Birmingham Depot.
1937—No. 23	A. GUINNESS SON & CO. LTD., St. James's Gate Brewery, Dublin; Empties returned to the Trader's Bristol Depot.
1937—No. 24	A. GUINNESS SON & CO. LTD., St. James's Gate Brewery, Dublin; Empties returned to the Trader's Cardiff Depot.
1937—No. 25	A. GUINNESS SON & CO. LTD., St. James's Gate Brewery, Dublin; Empties returned to the Trader's Liverpool Depot.
1937—No. 26	A. GUINNESS SON & CO. LTD., St. James's Gate Brewery, Dublin; Empties returned to the Trader's London Depot.
1937—No. 27	A. GUINNESS SON & CO. LTD., St. James's Gate Brewery, Dublin Empties returned to the Trader's Manchester Depot.
1937—No. 28	A. GUINNESS SON & CO. LTD., St. James's Gate Brewery, Dublin; Empties returned to the Traders' Glasgow Depot.
1937—No. 29	SAML. HANSON & SON LTD., 14, Eastcheap, London, E.C.3; Confectionery, Groceries, Provisions, Lemons, Nuts, &c.
1937—No. 30	HORLICK'S MALTED MILK CO. LTD., Slough; Malted Milk, Lemon Squash, Hardware, Glassware, Earthenware, &c.
1937—No. 31	HUGON & CO. LTD., Ogden Lane, Openshaw, Manchester; Suet, Lard, Tinned Fruits, Tinned and Packet Peas and Beans, &c.
1937—No. 32	HYGIENE CORPORATION LIMITED, Konnomy Works, Bedford Avenue, Trading Estate, Slough; Scouring Powders, Shoe Polish.
1937—No. 33	THE MANCHESTER MUTUAL TRADING ASSOCIATION LIMITED, 36, Granby Row, Manchester; General Household Requisites.
1937—No. 34	THE ORIENTAL FIBRE MAT & MATTING COMPANY, Vorda Works, Highworth, Wilts; Floor Coverings.
1937—No. 35	OXENDALE & CO. LTD., Granby House, Granby Row, Manchester; General Household Requisites.
1937—No. 36	JOHN PATERSON & CO. LTD., Clensel Works, Orr Street, Glasgow; Ammoniated Liquid Soap, Ammonia Solution.
1937—No. 37	JOHN PATERSON & CO. LTD., Clensel Works, Orr Street, Glasgow; Returned Empties.
1937—No. 38	W. H. SMITH & SON LTD., Strand House, London, W.C.2; Books, Stationery, Newspapers, &c.
1937—No. 39	SPILLERS LIMITED, 40, St. Mary Axe, London, E.C.3; Dog Biscuits, Bird Seed, &c.
1937—No. 40	STARCH PRODUCTS LIMITED, Gludex Works, Mill Street, Slough; Glue and Dextrine.
1937—No. 41	VALENTINE & SONS LTD., Westfield Works, Dundee; Calendars, Pictures Framed, Stationery, Fancy Goods, &c.
1937—No. 42	R. D. WADDELL LIMITED, Napiershall Street, Glasgow, N.W.; Confectionery, Eggs, Groceries, Preserves and Provisions, &c. (*Applicable also to traffic consigned by two Associated or Subsidiary Companies.*)
1937—No. 43	WESTERN MARGARINE LIMITED, Western Avenue, Acton, London, W.4; Margarine, Lard, &c.
1937—No. 44	WIGGINS, TEAPE AND ALEX PIRIE (SALES) LIMITED, 46/58, Mansell Street, Aldgate, London, E.1; Paper.
1937—No. 45	THE CARRONGROVE PAPER CO. LTD., Carrongrove Paper Mills, Denny, Stirlingshire; Paper.
1937—No. 46	CARRERAS LIMITED, Arcadia Works, Hampstead Road, London, N.W.1; Manufactured Tobacco, &c.
1937—No. 47	THE CENTRAL AGENCY LIMITED, 50, Bothwell Street, Glasgow, C.2; Thread, Needles, Silk Waste, &c.
1937—No. 48	F. W. WOOLWORTH & CO. LTD., New Bond Street House, 1/5, New Bond Street, London, W.1; All Goods for sale or use at the Trader's Stores, with certain exceptions.
1937—No. 49	W. BARRATT & CO. LTD., Footshape Works, Northampton; Boots, Shoes, &c.
1937—No. 50	THE BRITISH BROADCASTING CORPORATION, Broadcasting House, Portland Place, London, W.1; Periodicals.
1937—No. 51	HORLICK'S MALTED MILK CO. LTD., Slough; Malted Milk, Lemon Squash, Earthenware, Glassware, Hardware, &c.
1937—No. 52	JAMES AIKMAN & SONS, 43–53, Jeffrey Street, Edinburgh; Boots and Shoes.
1937—No. 53	J. H. BOUNDS, 4, Whitworth Street, Manchester; Cotton, Linen, and Woollen Goods.
1937—No. 54	BRITISH STEAM SPECIALTIES LIMITED, Fleet Street, Leicester; Machinery Parts, &c.
1937—No. 55	MONTAGUE BURTON LIMITED, Hudson Road Mills, Leeds, 9; Clothing.
1937—No. 56	CO-OPERATIVE WHOLESALE SOCIETY LIMITED, 1, Balloon Street, Manchester; Shirts.
1937—No. 57	DOMINION DAIRY CO. LTD., Aylesbury, Bucks; Butter and Cheese.
1937—No. 58	SAMUEL DRIVER LIMITED, Burton Road, Dewsbury Road, Leeds; Clothing, Drapery, and General Stores Wares.
1937—No. 59	DRYAD LIMITED, 42, St. Nicholas Street, Leicester; Cane Work, Plywood, Rush Work, Raffia, &c.
1937—No. 60	THOS. FATTORINI (SKIPTON) LIMITED, 1–7, Newmarket Street, Skipton, Yorkshire; Clothing, Drapery, and General Stores Wares.
1937—No. 61	W. A. HOGG LIMITED, 19, Queen Street, Leeds; Clothing and Woollen Goods.
1937—No. 62	ALFRED E. JONES LIMITED, 32, 35 and 502, St. John's Market, Liverpool; Meat, Meat Pies, and Sausages.
1937—No. 63	KIMBERLIN, BROWN & CO. LTD., "Kay Bee" House, Charles Street, Leicester; Ladies' Outwear and Underwear, Gloves, and Hosiery.
1937—No. 64	H. PEARSON LIMITED, Old Trafford, Manchester; Clothing and Drapery.
1937—No. 65	POLIKOFF LIMITED, 31–51, Chatham Place, London, E.9; Clothing.
1937—No. 66	S. SIMPSON LIMITED, 92–100, Stoke Newington Road, London, N.16; Clothing and Woollen Goods and Cloth Patterns.
1937—No. 67	JAS. SMITH & SONS (CLEANERS) LTD., The Dye Works, Dewsbury; Dyed and Cleaned Goods, &c.
1937—No. 68	S. A. SQUIRRELL & CO., Colton Street, Leicester; Boots and Shoes.
1937—No. 69	SUNDERLAND & SONS LTD., 4, Darnley Street, Glasgow; Clothing and Woollen Goods, &c.
1937—No. 70	R. D. WADDELL LIMITED, Napiershall Street, Glasgow, N.W.; Bacon, Hams, Cooked Meat, Dripping, Lard, Meat and Fruit Puddings, Meat Pies, Preserved Provisions, and Sausages. (*Applicable also to traffic consigned by two Associated or Subsidiary Companies.*)
1937—No. 71	WILLSONS (LONDON & PROVINCES) LIMITED, 10–18, Clifton Street, Finsbury, London, E.C.2; Blouses, Frocks, Hats, Mantles and Millinery.
1937—No. 72	ACHILLE SERRE LIMITED, Blackhorse Lane, Walthamstow, London, E.17; Dyed and Cleaned Goods, Tricycle Carriers, Tyres, &c. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
1937—No. 73	D. JONES, DICKINSON & CO. LTD., Dowlais, South Wales; Cake.
1937—No. 74	THE SUFFOLK IRON FOUNDRY (1920) LIMITED, Gipping Works, Stowmarket; Mangles, Mincers, Machines, Sports Equipment, Hardware, Electric Fires, Carpet Sweepers, &c.
1937—No. 75	THE FLEETWAY MANUFACTURING CO. LTD., Winton House, St. Andrew Street, London, E.C.4; Domestic Woodware, &c.
1937—No. 76	NESTLE'S MILK PRODUCTS LIMITED, 6 and 8, Eastcheap, E.C.3; Chocolate, Cocoa, Confectionery, &c.
1937—No. 77	GERRISH, AMES & SIMPKINS LIMITED, Carlington Works, 129, 131 and 133, Mare Street, Hackney, London, E.8; Clothing, &c. (*Applicable also to traffic consigned by one Associated or Subsidiary Company.*)
1937—No. 78	THE NEW IMPERIAL MOTORS LIMITED, Spring Road, Hall Green, Birmingham; Motor Bicycles.
1937—No. 79	FARMA CREAM PRODUCT CO. LTD., 23–25, Prince of Wales Crescent, London, N.W.1; Butter, Cream, Milk Powder, Condensed Milk.

OFFICIAL NOTICES

South Indian Railway Co. Ltd.

THE Directors are prepared to receive Tenders for the supply of:—
4 BROAD GAUGE LOCOMOTIVE TANK ENGINES (P.T. CLASS).

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Co, Ltd., marked "Tender for locomotives," with the name of the firm tendering, must be left with the undersigned not later than 12 noon, Friday, February 5, 1937.

The Directors do not bind themselves to accept the lowest or any tender.

A charge, which will not be returned, will be made of £2 for each copy of the Specification.

Copies of the Drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, S.W.1.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
January 6, 1937.

Universal Directory of Railway Officials and Railway Year Book

42nd Annual Edition, 1936-37

Price 20/- net.

This unique publication gives the names of all the principal railway officers throughout the world, together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented.

THE DIRECTORY PUBLISHING CO. LTD.
33, Tothill Street, Westminster, S.W.1.

RAILWAY AND OTHER REPORTS

Salvador Railway.—The accounts for the year ended June 30 show an operating loss of £3,293 (against a profit of £3,717 for 1934-35). After crediting various amounts totalling £98,749 written back in accordance with the scheme of arrangement, there is a net credit balance for the year of £115,029. The debit now carried forward amounts to £56,763, to which has to be added special expenditure on hurricane damage. In his report the general manager states that although operating costs might have been reduced further by curtailing the service, the effect would have been to reduce revenue still more. The only way to increase net revenue is to improve the service by a frequent service of small motor units. To this end, the company has been building a railcar which it is hoped to put into service next dry season.

United Railways of the Havana and Regla Warehouses Limited.—Combined receipts for the year to June 30 last improved from £1,281,379 to £1,316,383, and as expenses were reduced from £1,317,065 to £1,298,983, the past year's debit balance is only £27,673, against £75,447 in the previous year. After crediting investment income and debiting full year's interest on debentures and debenture stocks (£614,883), accrued interest on unpaid debenture interest, exchange loss, &c., the year's deficit is £921,343 (against £1,045,067), which increases the forward debit balance to £5,412,162. Under the scheme of arrangement originally sanctioned in 1930, and extended in 1932 and 1935, the company is granted a moratorium expiring on various dates in 1937 in respect of the interest and sinking fund provisions of its debenture issues with power to the Stockholders' Committee to extend the period for one further year.

Engineering Recruits for the Army

The War Office announces the inauguration of a new scheme for obtaining engineering tradesmen recruits for the Army from the Royal Ordnance Factories, the railway companies, and many of the first class engineering firms, who have undertaken to co-operate. The scheme is intended to attract unmarried engineering tradesment between the ages of 21 and 25 years, who have completed an apprenticeship in certain skilled trades. The number of men required by March 31, 1937, is 1,000, and the trades for which there are vacancies are fitters, turners (Royal Army Ordnance Corps only), electricians, and instrument mechanics. Terms of enlistment are:—

(i) Royal Engineers—6 years with the Colours and 6 on the Reserve.
(ii) Royal Army Ordnance Corps—3 years with the Colours and 9 on the Reserve.

The co-operation which has been promised by the large undertakings mentioned above will take the form of facilitating enlistment and of giving favourable consideration to applications for re-employment when the men concerned pass to the Reserve at the conclusion of their colour service. The men can remain members of their trades union while in the Army and if not members they can join whilst serving.

The particular advantage of the scheme to recruits is that during their Army service they will be engaged at their civilian trade and when they leave to go to the Reserve they will have had several years more experience under varied conditions, which will be a great asset to their future employers. Moreover, they will join the Army knowing that they will be eligible for employment when they leave; they are trained men and will on discharge possess the qualifications of having been continuously employed as skilled men. Should they, on the other hand, decide while in the Army to make the Army a career, and their qualifications are sufficient, they will have an opportunity of doing so and of reaching the more highly paid ranks.

Pay and other conditions (food, accommodation, clothing, medical attention, etc.) will be those normally applicable to men enlisted as Army tradesmen, viz., pay commencing at 22s. 9d. a week, rising at the end of a year (subject to passing the usual trades test) to 35s. Full pay is issued during holiday periods (normally 28 days a year), together with a ration allowance of 1s. 11d. a day (present rate). During the periods of Reserve service, Reserve pay of 9d. a day (5s. 3d. a week) is issued. Full information regarding the conditions of enlistment, together with application forms, can be obtained at any recruiting office. Applicants will be interviewed, trade tested, and medically examined in their own town as far as possible.

The Transandine Railway

The Chilean Government has sent a message to Congress proposing the acquisition of the Chilean Transandine Railway and it has been reported that the Argentine Government is considering the purchase of the Argentine Transandine Railway. A later message, however, states that the Under-Secretary at the Argentine Ministry of Public Works has no knowledge of negotiations being in progress with this object. It was rather a question, he said, of the Government helping the company to repair the line in order to re-establish traffic.

The Transandine Railway, a metre-gauge line of 155 miles long, forms a link between the systems of the Buenos Ayres & Pacific on the one side of the Andes and the Chilean State Railways on the other, although these are on the 5 ft. 6 in. gauge. It is the highest railway in regular operation and at its highest point, a tunnel under the Uspallata Pass, it attains an elevation of 10,521 ft. A rack system is used on 22 miles. There are 111 miles of line in Argentina owned by the Argentine Transandine Railway Company, and 44 miles in Chile owned by the Chilian Transandine Railway Company but worked by the Chilean State Railways.

Through rail traffic was interrupted in January, 1934, by floods and an avalanche which destroyed a portion of the Argentine section. The gap is at present bridged by a road motor service; this was described and illustrated in our Road Transport Section of August 30, 1935.

Railway Share Market

Sentiment in the stock and share markets has been affected by the added uncertainties attaching to the international political situation. As was perhaps to be expected, Home railway stocks were influenced by general market conditions, but although prices showed an easier trend a firm undertone was maintained, largely owing to the excellent impression created by the first traffic returns for 1937. The market is taking the view that if traffics continue to be of a favourable character during the next few weeks the directors may be influenced in deciding on a liberal dividend policy as regards the junior stocks.

It is also being pointed out that at their present prices Home railway junior stocks appear to offer a sound and promising means of participating in the further recovery in internal trade conditions which is generally expected during the next twelve months. L.M.S.R. ordinary was inclined to fluctuate owing to varying estimates of the possible dividend for 1936, which continue to be for 1 per cent. or 1½ per cent. Despite lower receipts from coal, the railways traffics for the past week show a satisfying increase of £17,000. The 1923 preference was bought on the favourable yield offered and on the belief that a good increase in the cover for the dividend on this stock can be expected this year. L.N.E.R. issues were firmer following publication of the past week's traffic gain of £49,000. It is being pointed out that in respect of 1935 credit was not taken in the accounts for over-payment of rates and that in respect of 1936 it would therefore seem that a considerable allowance could be made for this—in which case ½ per cent. may very well be paid on the second preference stock. Southern deferred did not keep best prices, but was in demand on the view that although the dividend is not expected to exceed ½ per cent., the price appears moderate in relation to L.M.S.R. ordinary, even if the highest dividend estimate of 1½ per cent. on the latter were realised. Last week the Southern's traffics disclosed a good advance of £27,000. Great Western ordinary was lower on balance, but steadier following publication of the £15,000 traffic gain shown by the past week's figures. It is confidently expected that the dividend will again be brought up to 3 per cent. for 1936 and the current market view is that there seem reasonable prospects of a larger payment for 1937.

Argentine railway stocks did not keep best prices, but buyers were about at the rather lower levels ruling. Argentine Transandine issues were marked up on the news that the Argentine Government is contemplating purchase of the line. In other directions, San Paulo rose sharply on expectations of a larger dividend. Canadian Pacific issues made better prices.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1935-36	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1935	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1936	Prices: Lowest 1936	Prices: Jan. 6, 1937	Yield % (See Note)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili) & Bolivia	834	3 1 37	16 170	+ 6,870	1	2,370	4 9 0	– 2 550	Ord. Stk.	15	15¼	27½	Nil
	Argentine North Eastern ..	753	2.1.37	7,463	+ 1,270	27	247,388	217,086	+ 30,302	,,	12	2	15½	Nil
	Argentine Transandine ..	—	—	—	—	—	—	—	—	A. Deb.	54	45	72½	5½
	Bolivar	174	Nov., 1936	5,000	— 1,000	48	68,600	66,600	+ 2,000	6 p.c. Deb.	9	5	7½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	16	11½	17	21516
	Buenos Ayres & Pacific ..	2,806	2.1.37	100,186	+ 16,108	27	2,120,824	2,030,008	+ 90,816	Ord. Stk.	17½	6	17	Nil
	Buenos Ayres Central ..	190	26.12.36	$138,500	+ $31,700	26	$3,763,100	$3,141,100	+ $622,000	Mt. Deb.	31½	11	39½	Nil
	Buenos Ayres Gt. Southern	5,084	2.1.37	163 275	+ 29,609	27	3,177,934	3,250,372	— 72,438	Ord. Stk.	31¾	13¾	30½	Nil
	Buenos Ayres Western ..	1,930	2.1.37	59,739	+ 14 204	27	1,167,138	1,117,136	+ 50,008	,,	29¾	11	29½	Nil
	Central Argentine ..	3,700	2.1.37	151,932	+ 22,766	27	3,785,334	3,171,549	+ 613,785	,,	32932	8¾	32½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	21	4½	20	Nil
	Cent. Uruguay of M. Video	273	26 12 36	12,586	+ 590	26	313,642	263,711	+ 49,931	Ord. Stk.	7¾	3	9	Nil
	Do. Eastern Extn.	311	26 12 36	2 445	+ 279	26	52,922	43.708	+ 9,214	—	—	—	—	—
	Do. Northern Extn.	185	26 12.36	1,418	— 102	26	36,159	31,465	+ 4.694	—	—	—	—	—
	Do. Western Extn.	211	26 12.36	857	+ 101	26	25,270	20,184	+ 5,086	—	—	—	—	—
	Cordoba Central	1,218	2.1.37	31,950	+ 8,390	27	871,950	806,710	+ 65,240	Ord. Inc.	5	1	6	Nil
	Costa Rica	188	Oct., 1936	19.226	+ 7,592	18	71,989	55.349	+ 16,640	Stk.	36½	32	36	59/16
	Dorada	70	Nov., 1936	14,800	+ 1,500	48	156,500	130,700	+ 25.800	1 Mt. Db.	107	101½	104½	5¾
	Entre Rios	810	2.1.37	13.356	+ 3,191	27	346,456	308,189	+ 38.267	Ord. Stk.	17	6	17½	Nil
	Great Western of Brazil ..	1,082	2.1.37	8,000	— 700	1	1,600	4 600	— 3,000	Ord. Sh.	1/2	5/16	5/4	Nil
	International of Cl. Amer...	794	Nov., 1936	$426,881	+ $11,920	48	$4,650,651	$4,258,842	+ $391,809	—	—	—	—	—
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	1st Pref.	1/2	–/6	1/2	Nil
	La Guaira & Caracas ..	22¾	Nov., 1936	4,625	+ 1,365	48	50,475	41,145	+ 9,330	Stk.	9	3	7½	Nil
	Leopoldina	1,918	2.1.37	28,021	+ 6,450	1	5,578	5,379	+ 199	Ord Stk.	101½	3½	7	Nil
	Mexican	483	31.12.36	$285,500	+ $29,400	26	$7,039,300	$6,587 200	+ $452,100	,,	1¼	1/4	5/4	Nil
	Midland of Uruguay ..	319	Nov., 1936	8,878	+ 453	22	41,109	31,364	+ 9,745	,,	1½	1/8	1/2	Nil
	Nitrate	397	31.12.36	6,905	— 1,780	52	119 211	155,267	— 36,056	Ord. Sh.	63/6	41 9	27/8	Nil
	Paraguay Central	274	26.12.36	$2,936,000	+ $792,000	26	$67,219,000	$58.539,000	+ $8,680,000	Pr. Li. Stk.	85	71	81§	7/5
	Peruvian Corporation ..	1,059	Dec., 1936	81,512	+ 3,095	26	490,785	454.297	+ 36,488	Pref.	15	9	12½	Nil
	Salvador	100	26.12.36	c33,500	+ c5,000	26	c360,358	c347,996	+ c2,362	Pr. Li.Db.	18	16	15	Nil
	San Paulo	153½	27 12 36	31,305	+ 7,241	52	1 528,423	1,277,512	+ 250,911	Ord. Stk.	86	46½	91½	2¾
	Taltal	164	Nov. 1936	4,390	+ 385	22	16.810	16,645	+ 165	Ord. Sh.	115/32	14/–	1/8	87/8
	United of Havana	1,353	2.1.37	15,189	+ 263	27	426,914	415,138	+ 11,776	Ord. Stk.	3¼	1	4	Nil
	Uruguay Northern	73	Nov., 1936	1,268	+ 131	22	5,031	3,715	+ 1,316	Deb. Stk.	5	3	7½	Nil
Canada.	Canadian National	23,613	21.12.36	750,935	+ 52,768	51	36,100,563	33,709,141	+ 2,391,422	—	—	—	—	—
	Canadian Northern ..	—	—	—	—	—	—	—	— 4 p.c	Perp. Dbs.	76	51	73½	5516
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	104¾	99¾	102½	3/4
	Canadian Pacific	17,223	31.12.36	754,600	+ 61,200	52	27 712,800	25 935,800	+ 1,777,000	Ord. Stk.	16¾	10516	15	Nil
India.†	Assam Bengal	1,329	10.12.36	37,402	+ 3.821	36	900,740	860,227	+ 40,513	Ord. Stk.	8¾	8214	8½	3½
	Barsi Light	202	10.12.36	2,632	— 1,298	36	80,797	98 370	— 17,573	Ord. Sh.	77½	65½	66½	7½
	Bengal & North Western ..	2,107	20.12.36	76,301	+ 2,274	12	599,636	560,410	+ 39 226	Ord. Stk.	319	2925/8	308	5116
	Bengal Dooars & Extension	161	20.12 36	3,685	— 136	37	97.376	103,356	— 5,980	,,	127½	118	116½	6
	Bengal-Nagpur	3,268	10.12.36	179.175	+ 20,089	36	4,161,663	4,397,510	— 236,847	,,	104	100¼	101½	3516
	Bombay, Baroda & Cl. India	3,072	31.12.36	319.875	+ 54,000	39	6 257,325	5,982.450	+ 274.875	,,	114	1101/2	1101/2	57/6
	Madras& Southern Mahratta	3,229	10.12.36	166.875	+ 35,264	36	3.716,034	3,655,203	+ 6 1,831	,,	116½	108½	107½	7716
	Rohilkund & Kumaon ..	572	20.12.36	13.935	+ 26	12	102,784	97,800	+ 4,984	,,	311	786	307	5/8
	South Indian	2,532	10.12.36	105.210	+ 4,988	36	2,779,466	2,748,446	+ 31,020	,,	107½	1025/16	101½	5716
Various	Beira-Umtali	204	Oct., 1936	68,505	+ 2,758	5	68,505	65 747	+ 2.758	—	—	—	—	—
	Bilbao River & Cantabrian	15	Nov., 1936	341	— 1,559	48	14.949	16.953	— 2,004	—	—	—	—	—
	Egyptian Delta	620	20.12.36	7,299	— 647	37	181.437	181.429	+ 8	Prf. Sh.	21/4	15/8	15/3	61/16
	Great Southern of Spain ..	104	29.8.36	568	— 2,514	35	33,629	62.623	— 28 994	Inc. Deb.	1½	1/8	3½	Nil
	Kenya & Uganda	1,625	Nov., 1936	190,145	+ 6,878	48	2 319,197	2,186,377	+ 132,820	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	50½	37	47	7716
	Mashonaland	913	Oct., 1936	125,267	+ 13,284	5	125 267	111 983	+ 13,284	1 Mg. Db.	1051/2	1015/16	105	4¾
	Midland of W. Australia ..	277	Nov., 1936	13,196	— 1,323	22	67.261	63 781	— 1,520	Inc. Deb.	97	93½	94½	4¼
	Nigerian	1,905	14.11.36	77,128	+ 12,027	32	1,165,413	936 025	+ 229,388	—	—	—	—	—
	Rhodesia	1,538	Oct., 1936	229 964	+ 27,270	5	229 964	202 694	+ 27,270	4 p.c. Db.	107	10 3½	105	3516
	South Africa	13,263	12.12.36	892,349	+ 24,500	36	22,507,256	20,813,445	+ 1,693,811	—	—	—	—	—
	Victoria	4,728	Sept., 1936	790 314	+ 984	13	2,242 629	2,238,853	+ 3,776	—	—	—	—	—
	Zafra & Huelva	112	Oct., 1936	14,665	+ 1,978	44	80,613	114,122	— 33,509	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rates of exchange and not on the par value.

NOTE.—Antofagasta, Great Western of Brazil and Leopoldina aggregates are for 2 or 3 days.

Electric Railway Traction

Electrification in Poland

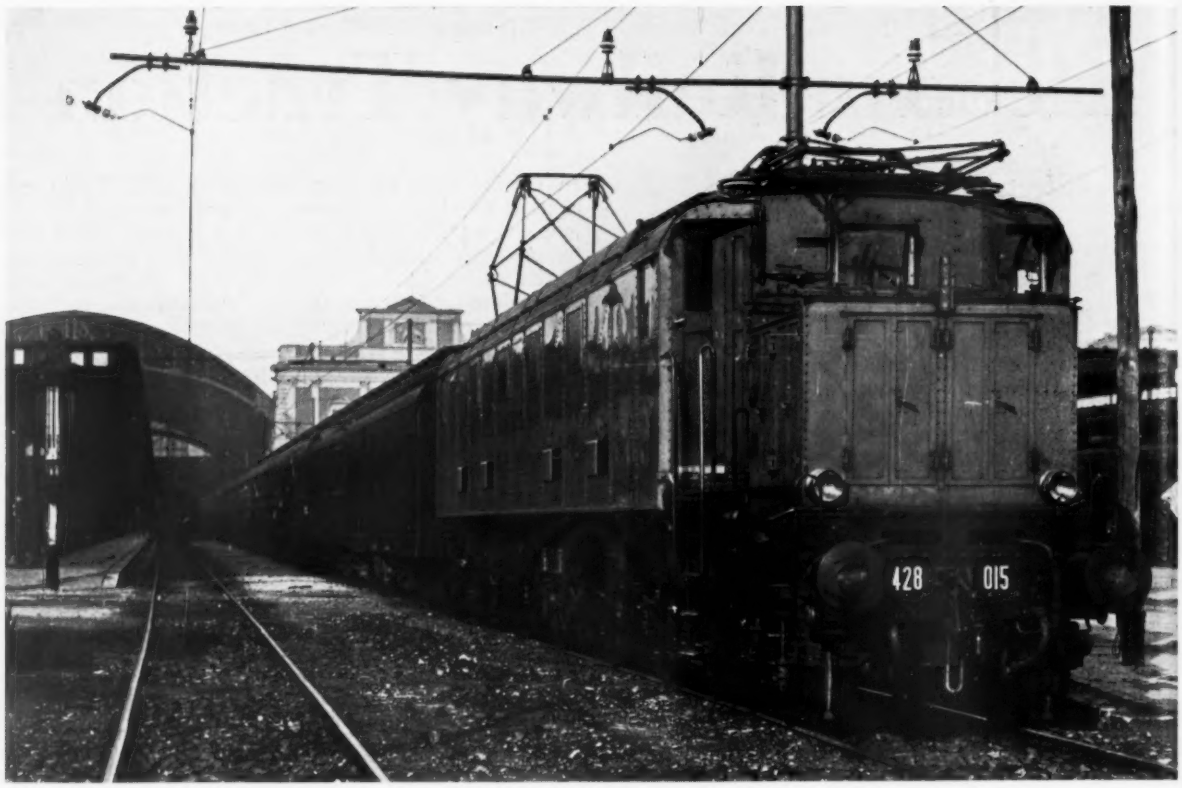
THE 30-mile section of the Warsaw suburban lines opened to electric traction just before Christmas is the first stage in the very comprehensive proposals adopted by the Polish Government some years ago. As early as 1922 a commission recommended the conversion of certain lines, and about eight years later the matter was taken up again and 17 tenders covering four different systems of electrification were received. These tenders were for the conversion of six of the main lines radiating from Warsaw and for the electrical equipment for the new direct line from Warsaw to Radom, then in the preliminary stages of construction. The Polish engineers proposed to spread this conversion over a period of 20 years. Eventually, however, the conversion of the Warsaw suburban lines was definitely sanctioned, as traffic problems were becoming pressing, and opportunity was taken to build a direct line between the Central and Eastern main-line stations which would help considerably the operation of through traffic. This scheme was put in hand with the technical and financial assistance of a British consortium comprised of Metro-Vick and the English Electric Company. It is the first portion of this scheme which has been completed and which is described elsewhere in this issue. Heavy grades rather than heavy traffic have been the reason for the attention focused on the possibilities of electrifying another Polish line, viz., that from Cracow to Zakopane, in the extreme south of the country. Over the long 1 in 40 grades of this route the traffic amounts only to about 1,400,000 trailing tons per km. per annum, compared with twenty times that amount on certain main lines. But the operating conditions obtaining in Poland do not always necessitate extremely dense traffic as a reason for conversion, nor is the saving in fuel costs of any great importance on certain routes, and Poland forms a most interesting example of the extremely wide variation in conditions over which electrification can be distinctly a paying proposition.

Some Electrification Notes

ELSEWHERE in this issue we reproduce an abstract of Sir Philip Dawson's presidential address to the Institute of Fuel, in which he commented on the relationship between electrification and fuel. Although Sir Philip's remarks did not form a résumé of the present position of railway electrification he gave some exceedingly interesting figures of energy and coal consumption and traffic handled on various systems throughout the world. In his more general remarks Sir Philip gave a sound exposition of the merits of electrification, but it seems advisable, in view of the influence of the Institute of Fuel and the wide circulation of its Journal, to draw attention to several points in which Sir Philip's figures or statements appear to require amplification or rectification. One of the most prominent of these is the criticism relating to the non-electrification of the L.N.E.R. line to Southend, which Sir Philip terms "a perfect gold mine." As to this description we certainly agree with him, but it seems to us that a much better case could be made out for the conversion of the L.M.S.R. route, which not only carries more passengers but certain tracks of which are already electrified for about half the distance. In dealing with the German railways, Sir Philip emphasises that in 1929 the coal consumption was 15,000,000 tons compared with 12,000,000 tons in 1934, but as even the present electrified mileage is equal only to 4 per cent. of the total it is obvious that the decrease is due to the tremendous fall in traffic and not to electrification. Speaking of the distances over which one can now travel by electrically-hauled train, Sir Philip mentioned that it would shortly be possible to travel thus from Paris to Irun, 330 miles. Actually both the statement and the distance are not quite right. The distance from Paris to Irun is 510 miles and there is still a gap of 215 miles between St. Pierre des Corps and Bordeaux which will not be operated electrically before 1939. On the other hand, the central route from Paris to Spain is within a few weeks of being operated electrically throughout over the 610 miles from Paris to Port Bou; or, by changing trains at Toulouse, it will be possible to make a journey from Paris to Irun behind electric locomotives over a distance of 670 miles. Similarly, Sir Philip's statement that one can travel from Modane nearly to Rome, a distance of 300 miles, is not quite right either in fact or in distance. Actually one travels from Modane through Turin and Genoa to Leghorn, a distance of 284 miles, but still ending 196 miles from Rome. Incidentally, in addition to the Leipzig—Berlin section it will be necessary to convert the Bolzano—Bologna division of the Italian State Railways before an all-electric journey between Berlin and Rome is possible, although an electric run between Berlin and Salzburg will be possible as soon as the Leipzig—Berlin section is converted. These remarks of ours are not to be taken as a disparagement of electrification; rather are they intended to draw attention to the less spectacular but more extensive and more lucrative lines on which electric traction has been the solution.

Single-Phase Commutator Mileage

In the early days of single-phase traction commutators had to be skimmed up every 5,000 to 6,000 miles, but according to a recent issue of the *Brown Boveri Review*, this figure has increased on the average from 10 to 20 times. Formerly the Swiss Federal Railways counted on a period of three years (corresponding to 300,000 km. or 186,000 miles) between the heavy overhauls given to their electric locomotives, but this period now has been increased by careful handling and improved design and supervision, to 400,000 km. (250,000 miles) in four years. Statistical records taken from locomotives with Brown Boveri electrical equipment showed that the 2-Co-1 express locomotives averaged 90,000 km. (56,000 miles) between commutator turnings, and the 2-Do-1 locomotives 203,000 km. (126,000 miles). Exceptional mileages given by three of the 2-Do-1 locomotives were 536,000, 548,000, and 604,000 locomotive km. (333,000, 340,000, and 375,000 miles) before the commutators were trued up, and it is hoped that soon a large number of single-phase locomotives will be able to run from one general overhaul to the next without intermediate re-turning of the commutators. This would give an appreciable reduction in the maintenance costs, and it has only entered the bounds of possibility by reason of the excellent organisation of the Swiss Federal maintenance methods and the close collaboration of the makers.



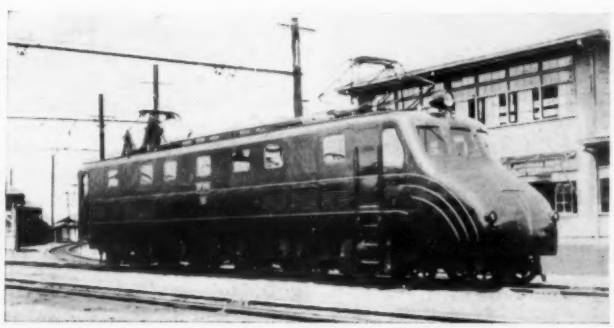
One of the new 4,000 h.p. locomotives of the Italian State Railways at the head of an express train

RAILWAY ELECTRIFICATION IN 1936

A year of achievement and of great and wide-spread preparations

ALTHOUGH railway electrification in one part of the world or another has proceeded continuously throughout the past year the actual mileage of steam railway converted was not great, and fell far short of the total for 1935, which was almost a record. However, big conversion schemes begun during the year show that there is no slackening off, and the total mileage opened to electric traction in 1937 should be well up to the maximum.

Actually, the only British line turned over to electric traction during the year was the Hampton Court junction—Weybridge—Virginia Water section of the Southern Railway, but much progress was made with conversion schemes begun in 1935, and another section of the Southern Railway's great Portsmouth electrification programme missed inclusion in the year's total only by three days, the Virginia Water—Staines section being opened on January 3, 1937, by through multiple-unit trains from Waterloo via Twickenham; on the same date a partial electric service down the main line to Guildford and Farnham was inaugurated also. Work now proceeding in England includes the conversion of the Wirral lines, L.M.S.R.; Manchester—Sheffield, Newcastle—South Shields; and north-east London lines, L.N.E.R.; and the remainder of the Southern Railway's main line to Portsmouth and the extension from Farnham to Alton.



1,800 *h.p.* 1,500 *volts d.c. electric locomotive, 3-ft. 6-in. gauge, Japanese Government Railways*

Activities on the London Passenger Transport Board's system, while including preliminary work on the new tube to West Hampstead and the conversion of the Rickmansworth—Amersham line, have been connected mainly with the provision of new rolling stock. In addition to the installation of numerous sets of metadyne control equipment on the Hammersmith—City trains, two new batches of trains were introduced. The first was a six-car train of 1,440 h.p. for the Hammersmith—City line with G.E.C. motors and B.T.H. control equipment. The second comprised the four experimental 1,660 h.p. six-car round-nosed trains designed to speed up the operation of the Piccadilly line, and described in detail in the December 11, 1936, issue of this Supplement. An order

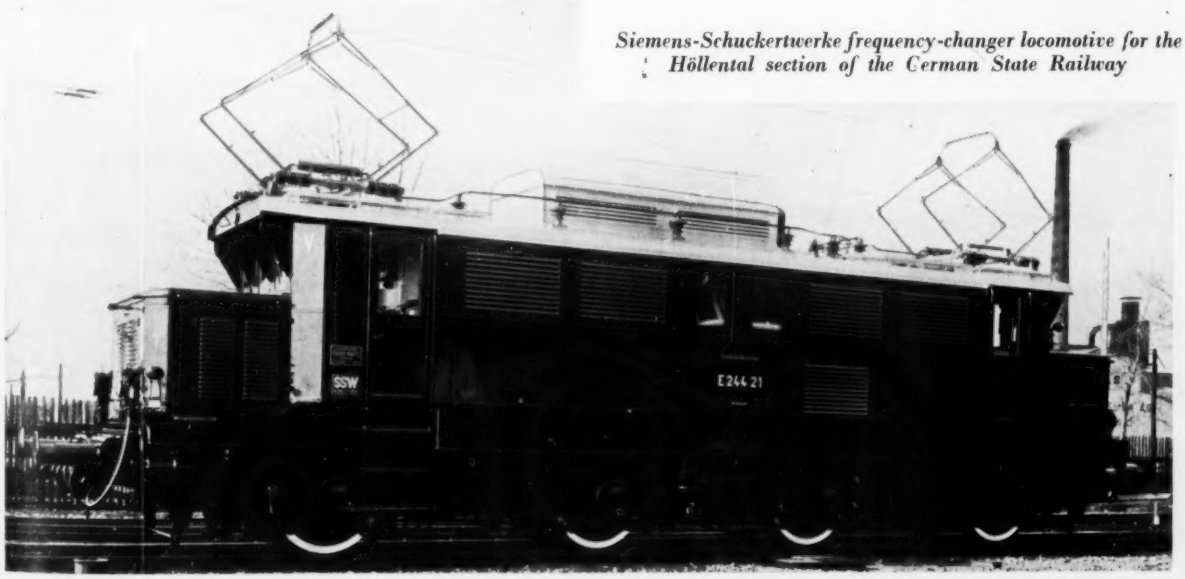
A scene on the recently electrified branch of the Höllental railway in the Black Forest. The electrification is of the single-phase type with a line voltage of 20 kV. and with the industrial frequency of 50 cycles

also was placed with Metro-Vick for the supply of three metadyne electrical equipments for installation in small locomotives.

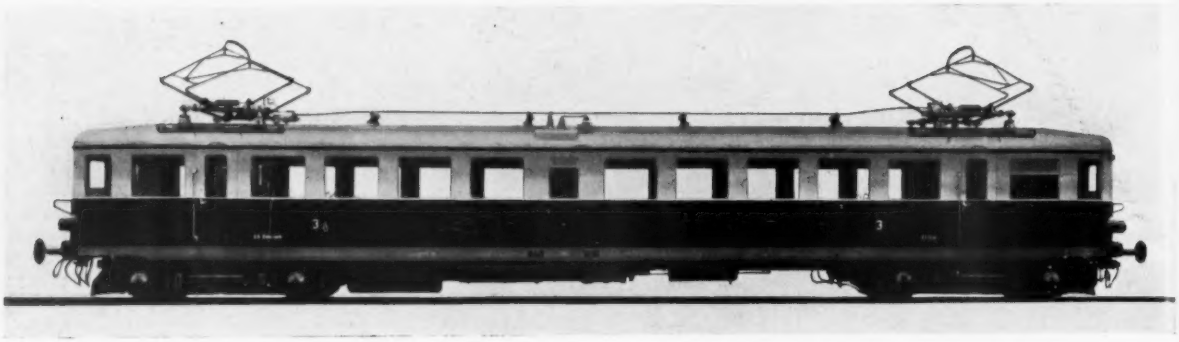
Less than 30 route miles of line were changed over to electric traction in France during 1936, this being in striking contrast to the previous year, when over 350 route miles were electrified. The 1936 total was made up of the 22 miles from Culoz to Chambery on the P.L.M. Mont Cenis main line (1,500 volts d.c.), and the 4-mile extension of the Paris suburban system from Bois Colombes to Argenteuil on the Etat (650 volts d.c.). Large conversion schemes now under way include the Paris—Le Mans main line of the Etat (131 route miles), which includes extensive quadrupling and realigning works near Paris; and the 215-mile P.O.—Midi main line from Bordeaux to St. Pierre des Corps. Virtually completed are the Brive—Montauban and Narbonne—Port Bou lines of the P.O.—Midi, and when these are finished it will be possible to travel by electrically-hauled through trains all the way from Paris to the Spanish frontier at Port Bou, 610 miles, or by a change at Toulouse, from Paris to Hendaye, 670 miles.

Great technical interest is attached to the only German line to be electrified during the year. This was the Höllental railway, from Freiburg to Neustadt (partial electric service began in July) and its branch, the Dreiseenbahn from Titisee to Seebrugg, which were electrified on the 50-cycle 20 kV. single-phase system and are worked by a variety of rectifier and frequency-changer locomotives. The Höllental line itself has a long 1 in 18 grade broken by short level sections at stations, and until a few years ago was worked by steam rack locomotives. Grade improvements and re-alignments were then put in hand, and large 3-cylinder 2-10-2 tank engines (adhesion only) have since operated the traffic, with the assistance of 2-6-2 tanks for piloting and for the lightest trains. Power for the electrified line is obtained through Scott-connected transformers. Four 2,000 h.p. (continuous rating) locomotives are in operation, built respectively by Brown Boveri, A.E.G., Siemens-Schuckertwerke, and Krupp. The first two are rectifier locomotives, and the third and fourth have single-phase motors, the Krupp motors being a development of the Punga-Schön principle. All four locomotives are of the Bo + Bo type and weigh 80 to 84 tonnes; the peak rating is as high as 3,000 h.p.

The Swedish electrification programme was carried forward steadily, and two important lines, Gothenburg—



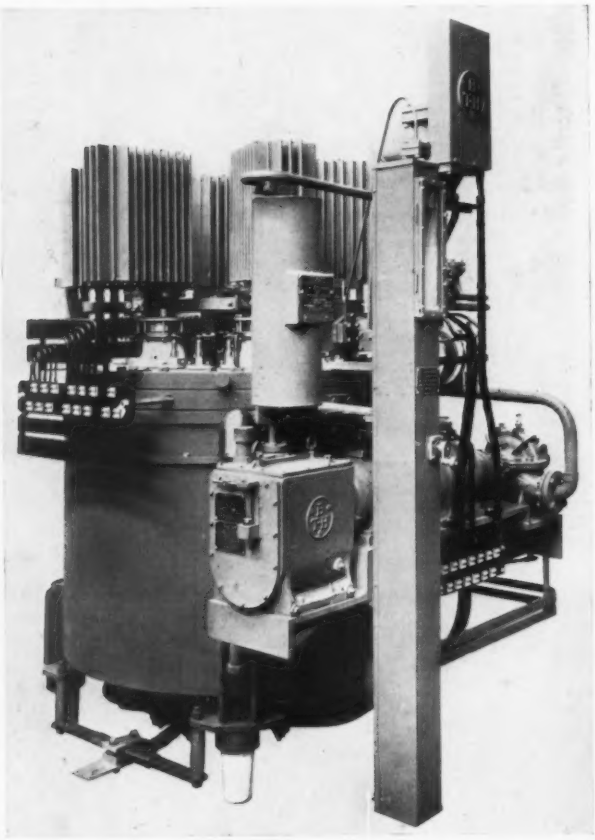
Siemens-Schuckertwerke frequency-changer locomotive for the Höllental section of the German State Railway



Single-phase 540-h.p. express motor-coach, Austrian Federal Railways

Malmö and Bollnäs—Aange, were opened to the standard 15 kV. 16⅔-cycle single-phase system. An advance of over 60 per cent. in the electrification of the Norwegian State Railways is to be recorded, this increase of 80 route miles consisting of the Kongsberg—Hjuksebö line (23 miles) and the Bratsberg railway (57 miles). In addition, the Tinnos railway, forming the connecting link between the Kongsberg and Bratsberg line, has had its system of electrification changed from 10 kV. single-phase (in use since 1912) to the standard 15 kV. 16⅔ cycles, so that through locomotive runs can be made.

Little work has been undertaken in Switzerland during the year, and the only Federal line in process of conversion is that from Sonceboz to Moutier. However, a start was made with the electrification of the Pilatus rack railway and the Vitznau—Rigi rack line, and the Bern—Lötschberg—Simplon line ordered several further lightweight motor coaches. Mile-a-minute electric services were introduced for the first time in Switzerland, between Geneva and Lausanne, and it is possible that even higher schedule speeds will follow the introduction of the new streamlined three-car trains. The conversion of the Warsaw suburban lines of the Polish State Railways is described elsewhere in this issue.



1,500 *kW.* 3,000 *volts B.T.H. mercury arc rectifier for the South African Railways*

Stimulated by sanctions and the general policy of no imports, all exports, the Italian State Railways made remarkable progress in the electrification of their lines, principally in the north-east corner of the country, where the Monfalcone—Trieste—San Pietro—Gorizia—Udine—Tarvisio network has been converted to the 3,000-volt d.c. system. The preference given to this group of lines forms a striking contrast to the policy prevailing in many other countries, where steam operation is being retained on lines near strategic frontiers. Rapid progress is being made with the southern main line from Salerno to Reggio Calabria, and it is expected that this line will be turned over to electric traction in the first half of 1937. Other State lines in course of conversion are Milan—Bologna, Ovada—Asti, San Giuseppe—Alessandria, Rome—Leghorn, and Milan—Domodossola, and the Rome—Sulmona line is being converted from three-phase to d.c. Private lines in course of electrification are the Milan—Como route of the North Milan Railway, and the Modena—Vignola Railway.

Six three-car streamlined trains were introduced on the 3,000 volts d.c. State lines, and also a number of the 2-Bo-Bo-2 locomotives of 4,000 h.p. For the operation of heavy goods trains to accelerated schedules on the Bologna—Florence—Rome—Naples and Naples—Foggia lines some twelve-axle 5,640 h.p. locomotives with nose-suspended motors are being built. During the 12 months ending October, 1936, the electric stock of the Italian State Railways increased by 58 locomotives, 6 motor-coaches with driving trailers, 24 motor-coaches for solo operation, and 6 high speed trains, all Italian-built, and orders for a further 100 locomotives were passed.

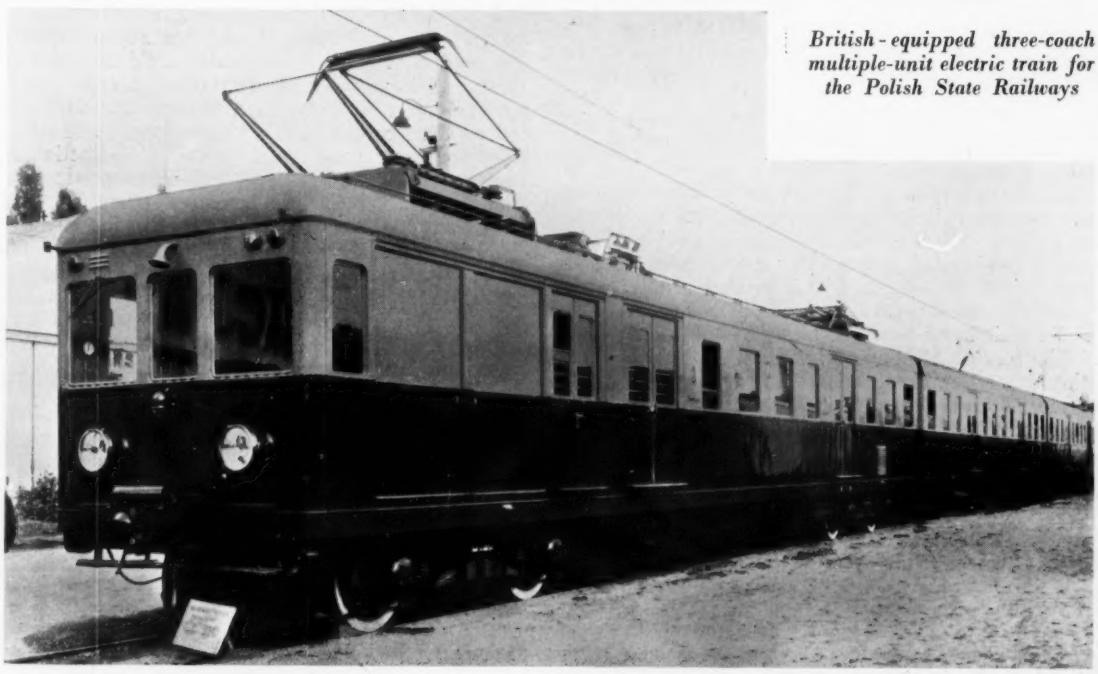
Conversion work in South Africa was largely of a preparatory kind for extensive openings of electrified lines in 1937, but an important addition to electrically-operated lines was made by the completion of the Cato Ridge—Durban section of the Natal main line. Partial electric haulage was begun on December 2, and full electric operation will be in force within one or two months. The Rand suburban electrification scheme, sanctioned in 1935, has been enlarged by the inclusion of the Germiston-Pretoria line, and the route mileage in process of conversion is now 126 compared with 74 in the original proposals.

British firms are closely connected with the South African conversion programme, and are busy on orders for loco-

motives, motor-coaches and substation equipment. Another scheme of great interest from the British point of view is the Central of Brazil Railway line out of Rio de Janeiro. It was hoped that a skeleton service would be run for 7 miles out of Rio from January onwards, but this seems unlikely, and a full service is not expected before May, although something in the nature of an inaugural trip was made on December 21. Another opening of British interest during the year was that of the 16-mile Borivli—Virar extension of the Bombay, Baroda & Central India Railways Bombay suburban system. Hewittic glass-bulb rectifiers are installed in the new substation. The New Zealand Government Railways are busy electrifying the Wellington—Johnsonville line, now suburban only since the construction of the Tawa Flats deviation, and six two-car multiple-unit trains have been ordered from the English Electric Company. Multiple-unit trains, but of four cars with semi-streamlined contour, have been introduced on the Japanese Government Railways, and another Japanese production was a batch of 1-Co-Co-1 locomotives with sloping front ends.

Interior of one of the new Hammersmith and City underground trains of the London Passenger Transport Board

Electrification of Warsaw Suburban Lines



British-equipped three-coach multiple-unit electric train for the Polish State Railways

AT the beginning of 1932 the Polish Government decided to authorise the electrification of the Warsaw suburban lines, and as at the same time it proposed to put in hand at an early date schemes for the conversion of certain main lines, 3,000 volts d.c. was chosen in order to avoid any future complication. Simultaneously a decision was made to construct a direct connecting line from the Central to the Eastern station (see map accompanying this article), and eventually to do away with the Danzig and Vilna stations. This connecting line has now been in operation for some time, and the work of reconstructing the Central and the Eastern stations at new levels to correspond with the through line is practically completed. The Central station had to be lowered, as the connecting line is in tunnel beneath the city to the left bank of the Vistula, which it crosses on a new bridge, at the far end of which the new Eastern station has been built at a higher level than the old one, these two former terminals being now through stations. The main line trains run through each of them to new carriage depots beyond. Tentative proposals were made at the time for the construction at some date in the future for inner and outer circles which would connect with all the radiating main lines. Finally, the electrification of a number of main lines was studied, and particulars of the estimates and general information will be found in the issue of this Supplement for January 12, 1934.

In August, 1933, a £2,000,000 contract for the conversion of the Warsaw suburban lines was signed by the Polish Government on the one hand and the Metropolitan-Vickers Electrical Co. Ltd. and the English Electric Co. Ltd. on the other, and it is the first part of this contract

which has just been completed. The contract was for the electrification of the new city line between the Central and Eastern stations; the line from the Central to Zyrardow (41 km.); from the Eastern to Otwock (23 km.) and to Minsk (36 km.). The route mileage to be electrified was about 105 km. (65 miles) and the track mileage 250 km. (155 miles).

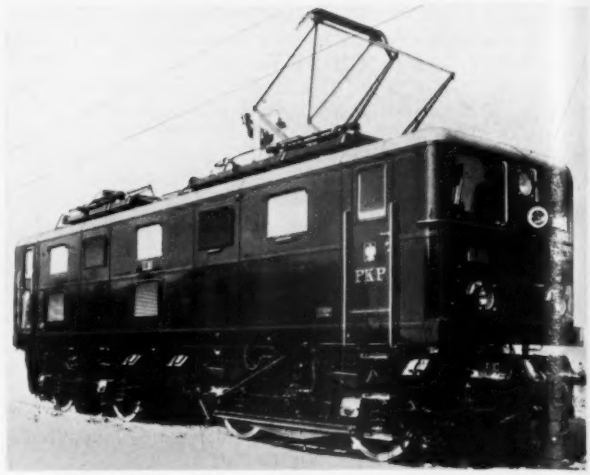
It was on December 15 last that the Polish Vice-Premier officially opened the first section, extending from Pruszkow, on the south-western line, through Warsaw Central and Eastern stations, and out to Otwock, on the south-eastern line, a distance of about 47 km. (29 miles).

The electric service is operated with overhead line at 3,000 volts d.c., power being taken at 35,000 volts, 50 cycles three-phase from the existing industrial supply system. The equipment covered by the contract includes six rectifier substations; six 2,200 h.p. electric locomotives; the complete electrical equipment of 76 three-car trains, and four shunting locomotives; and the overhead line equipment. The overhead line work is being carried out by British Insulated Cables Limited acting as principal subcontractor. The switchgear and a considerable amount of accessory equipment have been supplied by Polish subcontractors.

Of the substations, one has three 2,500 kW. rectifiers; three have two 2,500 kW. units each; and two have two 2,000 kW. units each. The rectifiers and associated control equipment, main transformers, high speed d.c. circuit breakers, instruments, relays and supervisory control apparatus were supplied from England (see issue of this Supplement for March 6, 1936); all other apparatus including indoor and outdoor switchgear, has been supplied by Polish manufacturers. All substations, with the exception of that at Warsaw West, which is manually controlled, are operated by supervisory control from convenient points. There are six track cabins equipped with high speed circuit-breakers for the sectionalising of the line. The main overhead equipment has bracket arm supports with catenary suspension of dual contact wires; the sidings have similar equipment but with only one contact wire. The scheme of bonding has been adapted to track circuiting on certain lines.

The locomotives are to be used for fast passenger services, and also for hauling freight trains through the tunnel section between the Eastern and

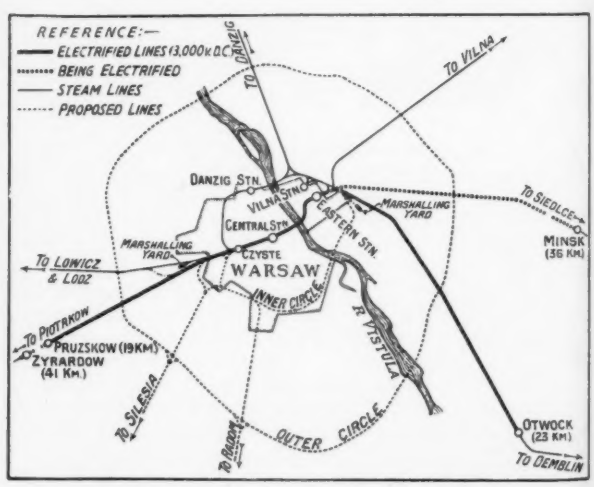
English Electric rectifier for the Polish State Railways electrification



British-built 2,200 h.p. electric locomotive for the Polish State Railways

Central station and they are of the Bo + Bo type weighing 78 tons, and each axle is equipped with a 550 h.p., 1,500-volt motor arranged two in series. The control is of the electro-pneumatic unit-switch type. The auxiliaries consist of two 3,000-volt combined motor-generator and blower sets, the generator supplying the 110-volt d.c. control and auxiliary supply and the blower supplying forced ventilation for the main traction motors. There are also two 110-volt motor-compressors for the brake system. Two locomotives are being supplied complete from England; of the remaining four, the electrical equipment is of British manufacture, but the mechanical parts were made in Poland.

The multiple-unit stock is made up of three-car sets each consisting of one motor-coach and two trailers. The motor coach is equipped with four 200-h.p., 1,500-volt motors, two being connected in permanent series. A second driving position is provided on the rear trailer coach which is articulated with the non-driving trailer. The control is of the camshaft type with electro-pneumatically operated line breakers and reverser gear. The 110-volt control supply is provided by a 3,000-volt motor-generator set, which in conjunction with a battery and voltage regulator also provides power for the auxiliary circuits.



Map showing Warsaw electrified suburban lines

MODERN ELECTRIFICATION NOTES*

SOME exceedingly interesting figures on transport of all kinds were given by Sir Philip Dawson in his presidential address to the Institute of Fuel on October 15. Certain of his remarks referring to electric traction are given below.

* * *

On the Continent there are some 11,000 miles of main line route operated electrically; a considerable proportion of the electricity used is supplied from hydro-electric stations, although a large amount is also being generated by steam power. The most complete example of main line electrification in the world is that of the Pennsylvania Railroad, which has electrified all its services between New York and Washington (and branches). Over this section 686 trains are operated daily (goods, main-line passenger and local passenger trains), equivalent to 34,740 train-miles and 21,118 locomotive-miles daily, involving the consumption of 800 million Board of Trade units of electricity a year. Comparing speeds attained on steam and electric routes, the steam operated Cheltenham Flyer averages 71·4 m.p.h., whilst the average speed on the electrified line of the Pennsylvania Railroad, between New York and Washington, is 76·6 m.p.h.

The speed of electrically-hauled trains in Germany is: Augsburg—Ulm (52·5 miles), 68·5 m.p.h.; Augsburg—Nuremburg (85·5 miles) 63·9 m.p.h. The above figures refer to long-distance trains, which on the rest of their journey are steam-hauled. The longest non-stop train hauled electrically in Germany is the Orient Express, Stuttgart to Munich, over a heavy road with gradients of 1 in 40 (a distance of 148·9 miles), at an average speed of 52·6 m.p.h. Very shortly one will be able to travel by electrically-hauled trains from Paris to Irun, 330 miles (a large portion of this route is already electrified), and one already does so from Modane nearly to Rome, a distance of 300 miles. As soon as the section Leipzig to Berlin is completed, one will do so from Berlin via Dresden and Munich to Salzburg, a distance of 500 miles.

In Great Britain, the Southern Railway (as compared with our other railways) has been very progressive; it has not only electrified the whole of its suburban system, but also its main line passenger service to Worthing, Brighton, and Hastings, and is extending it to Portsmouth, and the financial success achieved has surpassed the most sanguine expectations. All the electricity used is supplied by the grid from steam-operated power plants.

Dealing with the electrification of our railways, the Weir Report stated that: "Electric traction has shown itself to possess a definite element of superiority over steam traction, and the system is being extended wherever it has been adopted. Electrification places in the hands of the traffic manager a new system, which enables him to offer a more attractive transport proposition to the public and whose characteristics are capable of extensive development."

Referring to urban and inter-urban electrification, it said: "General economy success has characterised the adoption of electric haulage for metropolitan and suburban lines, and the more useful and better service has in every case brought about increased traffic, and the additional cost of the increased train mileage has been much less than the increase in the revenue resulting herefrom."

The financial success which has attended not only the suburban but also long-distance electrification carried out by the Southern Railway fully bears out the above statements. Yet with this brilliant result before it the L.N.E.R. is not electrifying to Southend (a perfect gold mine), it is only electrifying a small portion of its local services round London, namely that required by the L.P.T.B., and it is doing nothing to improve its branch line services, either as regards speed, frequency, or modern rolling-stock. Anyone questioning this has only to travel from Liverpool Street Station to Waltham Cross.

Main line electrification also brings about considerable reduction in the quantity of coal required by steam haulage, in addition to which the quality of the coal used in steam generating stations is cheaper than that required for steam locomotives. The Paris-Orleans Railway in France, which operates considerable sections electrically, states that 1·0 lb. of coal consumed in an electric generating station is equivalent to rather more than 4 lb. of the more expensive coal required and consumed by the locomotive. The electric locomotive of the same tractive effort is lighter than the steam locomotive and the time required for maintenance and the cost of it is less than that for steam. For the same service the average weight of an electric locomotive per kW. is 100 lb. as compared with 210 lb. with steam, and according to German figures one electric locomotive will replace two and a half steam locomotives.

The German railways in 1929 consumed 15 million tons of coal; in 1934 this had been reduced to 12 million tons. This amounted to 10 per cent. of the total output of coal in Germany as compared with 5 per cent. in the case of British railways. The total length of German railways which it is contemplated to electrify in the future handles 50 per cent. of the total traffic of the railways and the electricity required would be supplied as to 35 per cent. from hydro-electric stations. This is based on a consumption of 55 watt-hours per gross ton-mile at the power stations, which would correspond to 0·082 lb. of coal consumed per gross ton-mile, which corresponds to 25 per cent.. of the coal required for steam operation with the most modern steam locomotives.

The known decreases in coal consumption due to railway electrification in Austria, Sweden, Switzerland and Germany must amount to nearly 2,000,000 tons per annum.

	Main Line Railway Electrification, 1934–35			
	Per cent. of lines electrified to total route miles.	Per cent. of total traffic dealt with by electrified lines	Electricity consumed in millions of kWh.	Decrease in annual coal consumption in tons, due to electrification
Austria	15	22	147	470,000
Sweden	40	80	350	270,000
Switzerland	75	92	520	—
Italy	35	—	460	680,000
Germany	4	—	660	500,000

FURTHER SWEDISH ELECTRIFICATION.—The conversion of the Swedish State Railways' line from Laxå to Charlottenberg, on the Norwegian frontier, is proceeding apace, and it is expected that on January 18 single-phase electric traction will be inaugurated over the section from Laxå to Kil, a distance of 75 miles. The completion of the whole route is scheduled for the present year.

* See editorial comment on p. 81.

Publications Received

Das Elektrische Eisenbahnwesen der Gegenwart. Berlin (S.W. 68): Verlag für Sozialpolitik, Wirtschaft und Statistik G.m.b.H., Wilhelmstrasse 42. 11¾ in. by 8¼ in. 156 pp. Illustrated. Price (outside of Germany) 7.50 Reichsmarks.—As its title indicates, this special number of the well-known German journal *Elektrische Bahnen* sets out to give a résumé of electric traction as it has been in 1936. Its nine chapters are written by well-known German engineers, including Dr.-Ing. Wechmann, of the Reichsbahn; Ing. Walter Kleinow, of the A.E.G.; and Dr.-Ing. Paul Müller, of the Siemens-Schückertwerke. The text is authoritative, and is set off by no fewer than 348 illustrations. The contents comprise the general considerations effecting electrification and the choice of system; electric locomotives and their electrical equipment; the generation, transmission, and conversion of energy; rack and cable railways; underground railways and tramways; and there is a composite chapter on railcars which goes beyond the scope of electric traction.

Despite its title, a certain amount of space has been given to tracing the development of the various phases, and this is noticeable, especially in the sections on locomotives and locomotive equipment, where several quite ordinary and freak units built years ago are illustrated to the exclusion or brief mention of newer types. For instance, the old Reichsbahn E.52 class, the 1-C-C-1 Swiss Federal, Bo-Bo Midi, Spanish Norte Co-Co, the 20-year-old Chicago–Milwaukee centipedes and the almost equally ancient Great Northern Railroad converter locomotives, and, most remarkable of all, the Detroit, Toledo & Ironton Railroad 16-wheeler, are illustrated by line drawings or photographs, while such an up-to-date machine as the Reichsbahn 1-Do-1 is shown by a general arrangement drawing only 3½ in. long. The most modern Italian d.c. locomotives are depicted merely by two small half-tone illustrations, and the Italian and Dutch streamlined trains and the latest Paris–Orleans and Midi express locomotives are not illustrated, although several other locomotives are illustrated twice. As is usual in high-class German technical works, there are numerous detail diagrams most clearly reproduced, but, unfortunately, the standard of the general arrangement drawings is just the opposite. Indeed, the drawings of the three Italian three-phase locomotive types, the Stuttgart suburban cars, and the Chicago-Milwaukee 3,000-volt d.c. express locomotive are shocking, and scarcely a single detail can be picked out. But we remember seeing three of these blocks in *Elektrische Bahnen* some seven years ago. A valuable feature of the locomotive chapters is that the three Höllental locomotive classes (20 kV, 50 cycles, single-phase) are described.

It is the theory of transformation and conversion, rather than the details of actual practice, which receive attention at the hands of Dr. Kasperowski, of the Reichsbahn, and in this chapter are given illustrations and a description of the grid-controlled frequency converter as used on the Wiesental line (see *Electric Railway Traction Supplement* for July 27, 1934). Energy generation and transmission and overhead construction are dealt with by another Reichsbahn officer, Dr.-Ing. Usbeck, and he includes notes on the use of steam accumulators in power stations and overhead construction for high speeds, in addition to the more normal equipments. In the last chapter, particulars are given of the operation and equipment of *bergbahnen*, comprising rack, cable and telpher railways, and this section contains one of the most interesting illustrations in the whole work—to wit, Blenkinsop's steam rack locomotive of 1812, pulling a carriage full of passengers, and with the driver sitting on the front of the carriage!

The Supply of Electricity in Great Britain. London: Political and Economic Planning, 16, Queen Anne's Gate, S.W.1. 10 in. by 8 in. 171 pp. Price 6s. net (paper boards) and 8s. 6d. net (cloth bound). Postage 6d. extra.—Political and Economic Planning (PEP) is a non-party group advocating the more extensive use of planning in many phases of social and industrial life. Among its activities is the publication of reports on various subjects drawn up by committees of its members, and the present volume is the seventh of the series. In eight chapters it traces the development of the electricity supply industry in this country; describes the present state of the industry and its problems; discusses the Central Electricity Board and the grid; studies the various markets and their possibilities; and discusses the future of the industry and its reorganisation on the bases of the McGowan report and PEP's own proposals.

It is safe to say that as far as facts and figures are concerned there is no other volume at anything like the price which can approach the value of this report. It is useful in the first place for the concise descriptions of the constitution and functions of the Electricity Commissioners and the C.E.B., and for the equally concentrated dissertation on power-generating and distribution companies, and therefore may be used as a reliable work of reference. Secondly, the study of markets has been carried out in an excellent way, and so far as the nine-page section on railway electrification in Britain is concerned we cannot remember having seen a better-informed or more unbiassed view expressed within such a length, and it is enhanced by several useful tables. Indeed, all sections of the work are similarly supported, there being at the end of the book a total of 33 tables and six appendices, as well as an excellent index. In the railway section the accuracy of the information is of a high order, and only in the table of route mileages electrified do any errors occur, although we notice from this table that PEP does not recognise Japan's puppet State, Manchukuo.

But while the facts and information given in the first five chapters, the tables, and the appendices are of the greatest value to all connected with the electrical industry, and of much interest to many who are not, we cannot agree with PEP's diagnosis of ills, its analysis of the necessities of reorganisation, or its proposals, although the criticisms directed against the McGowan Report are well deserved. The District Electricity Commissioners suggested by the McGowan Committee, which are another form of PEP's Investigating Committee would be similar to the present Road Traffic Commissioners, who adjudicate on the wrangles of railway companies and road concerns fighting tooth and nail for a traffic demand inadequate to absorb supply. If there were twice the traffic the wrangles would be more than cut in half. The existing power and supply companies will do well to ponder on the advisability of allowing the further legal interference with their powers now suggested. The realistic remedy for the present difficulties is not the imposition of further bureaucratic measures, nor the elimination of small companies, nor the investigation of so-called inefficiency, as is inferred in the McGowan Report. Nor is it the planning and controlling of the lives and activities of everyone and everything, which seems to be the basis of PEP's existence. If the purchasing power of all sections of the community was commensurate with the price of production, the demand for and supply of electricity would be automatically equated, and there would be no more talk of rationalising the industry to fit a limited, though fairly large, demand. As the technical skill for power generation and distribution for every person and every industry in the British Isles is not in question, there would be no necessity for external committees with their ever-present threat of interference in industrial matters.